

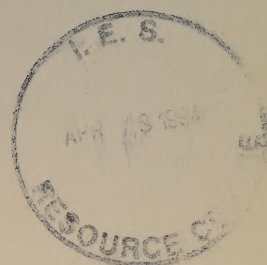
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EIS: MILITARY FLIGHT TRAINING. AN ENVIRONMENTAL IMPACT
STATEMENT ON MILITARY FLYING ACTIVITIES IN LABRADOR AND
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Summary



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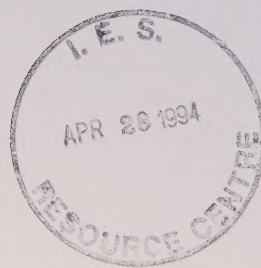
EIS: MILITARY FLIGHT TRAINING

An Environmental Impact Statement
on Military Flying Activities in
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Summary



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Executive Summary

PURPOSE

This Environmental Impact Statement (EIS) is submitted in accordance with the Federal Environmental Assessment and Review Process (EARP) to determine how military flying training in the Quebec-Labrador peninsula can continue to be best carried out to meet the needs of the people, the environment and the flying program.

This EIS is a comprehensive revision of the 1989 EIS and contains significant additional information and analyses to respond both to the Panel Guidelines and the Deficiency Statement concerning the original document.

KEY INFORMATION

THE PROJECT

Allied flying activity conducted from CFB Goose Bay Labrador, which has been ongoing continuously for the last forty years under various agreements, consists largely of low-level flying training (i.e., below 1,000 feet).

The air forces of the United Kingdom, Germany and the Netherlands, carry out flying training from Canadian Forces Base (CFB) Goose Bay under a Multinational Memorandum of Understanding (MMOU), an agreement which Allied Ministries of Defence have signed with Canada's Department of National Defence (DND). To a limited extent, the Canadian Forces also train at CFB Goose Bay. The agreement confines low-level flights to two designated areas in the Quebec-Labrador peninsula which total about 100,000 square kilometres. This MMOU will expire in 1996.

The Allies would like to remain at the Base after 1996 under a renewed agreement. However, their interest in so doing is subject to costs and the extent of restrictions emanating from the environmental review.

The current training activity is supported by about 1,700 DND and Allied military and civilian personnel and involves up to 98 combat aircraft being stationed at Goose Bay, with the primary objective of carrying out low-level training. Current low-level training amounts to 7,000-8,000 flights annually in an nine month training season. DND permits only modest annual increases to this training pending the outcome of EARP.

For operational and efficiency reasons, the desired project evaluated in this EIS involves about 1,800 military and civilian personnel, up to 119 aircraft and a maximum of 18,000 annual flights (of which about 15,000 would be low-level). Only inert or practice ordnance will continue to be used. There will be no live weapons, no sea range, no low-level supersonic flights and no large influx of military personnel arriving at Goose Bay - all features of a NATO Centre once considered for Labrador, but since cancelled.

CURRENT ENVIRONMENTAL PROTECTION PRACTICES

Current mitigative measures being practiced by DND and the Allies include an avoidance program. This program restricts pilots within those two training areas from flying at low-levels over any known occupied hunting or fishing camps and a number of wildlife species that are, or could be, sensitive to disturbance. These restrictions routinely close 10-20 percent of the training areas to such flights and on occasion, up to 40 percent. The avoidance program established to monitor the training area is comprehensive. It includes the use of both satellite and radio telemetry collars and aerial surveys for monitoring caribou; aerial surveys are also conducted for other forms of wildlife. Aside from caribou concentrations, moose, waterfowl and raptors are also avoided.

DND initiated a series of studies on various forms of wildlife which significantly expanded the knowledge base for the flora and fauna of the Quebec-Labrador peninsula. Many of these initiatives were conducted with the participation of the Canadian Wildlife Service, the wildlife offices of the provinces of Newfoundland and Quebec and aboriginal and non-aboriginal resource users.

Additional personnel were hired by CFB Goose Bay to improve and expand communication with resource users in the communities of Labrador and eastern Quebec. They include a Native Liaison Officer, a Community Liaison Officer and a Bio-physical Effects Coordination Officer.

The current financial cost of these protective measures amounts to \$1.2 million annually, most of which is paid for by the Allies.

ENVIRONMENT IN AND NEAR THE TRAINING AREAS

There are no permanent settlements in the two training areas. However, the areas are used by many Labradorians and some people in eastern Quebec for fishing, hunting, trapping and wilderness tourism. Harvesting wildlife resources, which is part of a way of life in the region, is of particular importance to aboriginal people in the region.

An integral part of this regional environment is the Town of Happy Valley-Goose Bay. It is the largest settlement in central Labrador, with a population of about 8,000. This population is made up of long-term residents, about 2,000 of whom are of aboriginal descent, as well as more recent arrivals. Unlike many other parts of Newfoundland, unemployment levels in this area are low because of the Allied presence at the Base. Over 1,000 civilian jobs in the town are in direct support of Allied training activities. Additionally, there is significant indirect employment attributable to the training program. While members of the civilian work force in the community who are employed at the Base are mostly wage earners, they too spend much of their free time using and enjoying the wilderness.

EFFECTS OF THE PROJECT ON ENVIRONMENT IN AND NEAR THE TRAINING AREAS

Noise is the major source of project effects on resource harvesting and wildlife. All other potential sources, such as those from jet exhaust, possible forest fires and contaminants from accidents, have been studied as part of the EIS and are assessed to range from "negligible" for most, to "moderate" for a few localized sites.

Although concern has been expressed by residents of the study area with respect to a number of wildlife species, caribou are of particular interest. The George River herd, which has grown from about 50,000 animals in the 1960s to over 500,000 today, is by far the largest in the region. Although there is no evidence that current training activities adversely effect this herd, it is recognized that there are occasions of higher sensitivity such as the pre-calving and calving period. As a result, and in recognition of the importance of the herd, all overflights of calving areas are prohibited during these periods. In addition, aggregations of the herd are avoided throughout the training season.

The current (and projected) amount and duration of jet noise in the training area does not cause hearing damage. Jet noise can "startle" people and wildlife. The noise does not appear to have a significant effect on moose, large carnivores, fur-bearing animals or waterfowl. Since there is very little information available on the effects of aircraft noise on many wildlife species, the EIS contains a proposed effects monitoring program. This program will be conducted over the life of the renewed MMOU and contribute significantly to the knowledge base of the Quebec-Labrador peninsula.

ABORIGINAL CONSIDERATIONS

The total population of the Quebec-Labrador peninsula is about 50,000 people, of whom there are about 7,000 Inuit and 7,000 Montagnais, Innu and Naskapi. While there are no permanent inhabitants of the training areas, many use the areas to harvest resources and pursue their way of life.

Some land claims in the region have been settled, as is the case with the James Bay and Northern Quebec Agreement and the Northeastern Quebec Agreement. Others have not yet been resolved: The Labrador Inuit Association (representing about 5,000 Inuit living in many Labrador communities), the Innu Nation (representing about 1,300 Innu living in Sheshatshit and Davis Inlet), the Conseil des Atikamekw et des Montagnais (CAM) (about 2,500 in the region) and the Labrador Métis Association (with a membership of about 1,500) are all at various stages of land claims negotiations with the Federal and Provincial governments. In some cases, these claims overlap each other as well as portions of the training area, and in total, encompass it all.

Land claims will not be affected by this project. DND supports the resolution of outstanding land claims and will respect the terms of the settlements.

ECONOMIC AND SOCIAL EFFECTS OF THIS PROJECT

Over 1,000 Canadian civilians, 300 of whom are of aboriginal descent, are "directly" employed in support of this Allied training program. The Allies spend over \$80 million annually in salaries, operations, maintenance and construction in Happy-Valley Goose Bay. DND spends about \$35 million annually at Goose Bay; other government departments and agencies have much smaller expenditures. Continuation of flying training in a have-not part of Canada assures the maintenance of, and increases to, civilian jobs and Allied expenditures.

	Current (1992/1993)	Projected (1996)
Number of Canadian Civilians		
Directly Employed (approx)	1,080	1,150
Total Expenditures (approx)	\$138M	\$230M

CURRENT DIFFICULTY AND POSSIBLE OPTIONS

DIFFICULTY

Increasingly larger portions of the training area are closed to low-level flying as a result of the avoidance program. This practice is making training increasingly difficult. At the current rate, closures are expected to preclude viable training in the near future, thereby forcing Allies to leave.

OPTIONS

Two options have been identified to allow the project to continue while protecting the environment.

Option A involves the continuation of flying training within the two existing training areas of 100,000 square kilometres, while maintaining a reduced avoidance program. This is the least acceptable of the options.

Option B requires a reconfiguration of the training area, providing about 130,000 square kilometres, of which no more than 100,000 square kilometres would be used for training at any one time. This will allow the maintenance of current avoidance standards, now and for the foreseeable future. This reconfigured area takes into account many of the concerns raised by resource users, including the aboriginal community, by shifting the training permanently away both from most of the traditional areas favoured by the George River caribou herd, and from the Harp Lake Area. Additionally, limited withdrawal from the southern portion of the existing training area from the Quebec North Shore, will increase the buffer zone between communities located along the coast and military flying. This Option permits enhanced protection of the environment and ensures the viability of the training program.

A map depicting the training areas under each option follows this Executive Summary.

CONCLUSIONS

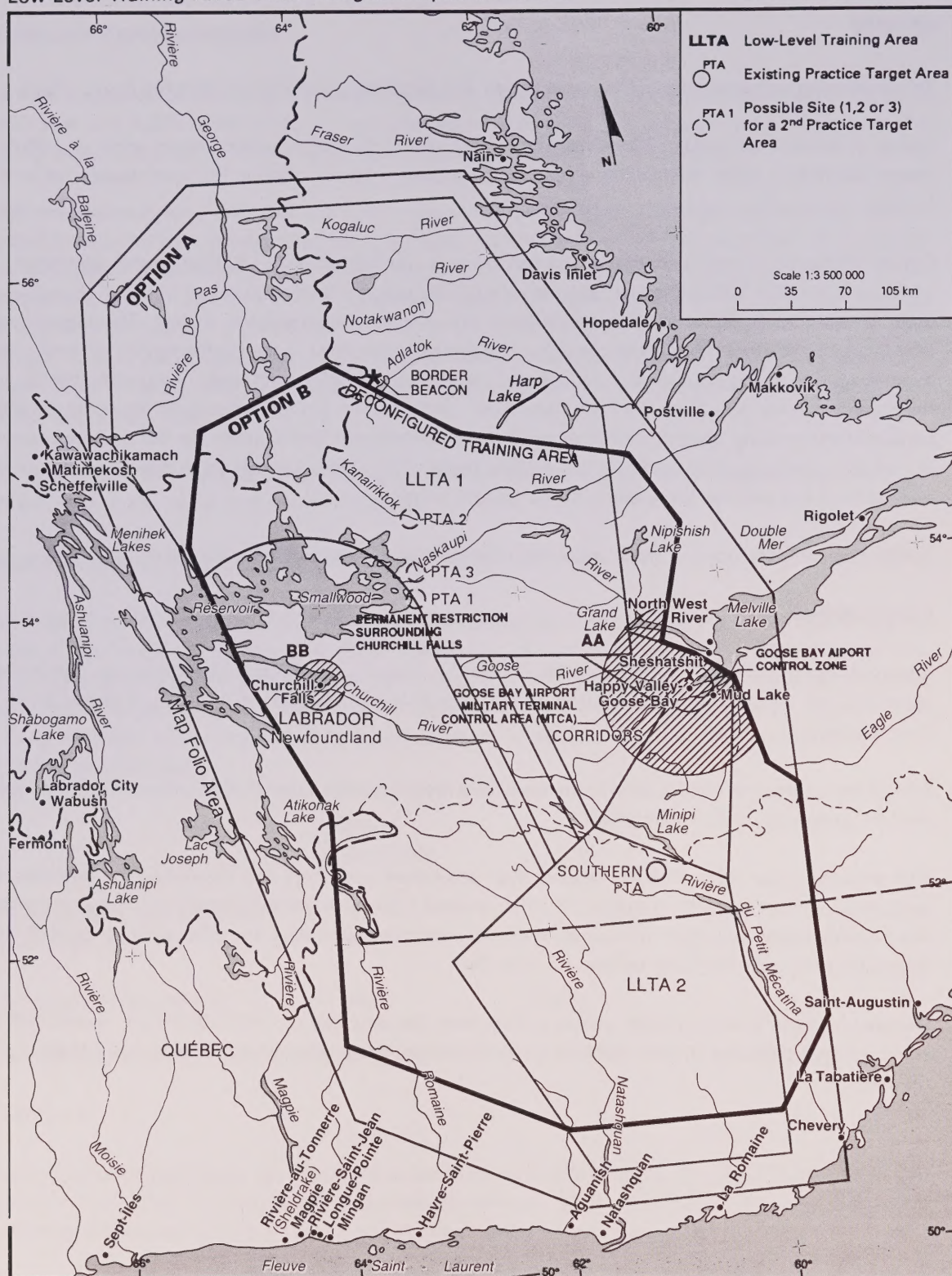
The impacts of the project range from "negligible" to "minor", and in very few cases, to "moderate", depending on whether mitigation Option A or B is selected. Option B provides a higher level of environmental protection.

Effects monitoring and continuation of the avoidance program under either Option will provide an adequate level of protection of the environment.

This project, under either Option, ensures that associated economic and environmental interests are compatible and not mutually exclusive. Continued Allied training means maintaining both jobs for civilians and environmental protection measures, measures which include Allied and DND expenditures of \$1.5 million for each year the Allies remain at Goose Bay.

Should the Allies wish to remain at Goose Bay after the outcome of EARP, DND will ensure that the environmental principles of that outcome are incorporated into a renewed agreement, and adhered to by the Allies.

EXECUTIVE SUMMARY



Summary

1.0 INTRODUCTION

This is the Summary of the Environmental Impact Statement (EIS) on military flight training activities conducted from CFB Goose Bay. It describes the review process for which the EIS was prepared and the key features of the project under review. The Summary also highlights the main findings of the EIS to provide readers with an understanding of the project's environmental impact and the actions to be taken to reduce the negative impacts and to enhance the positive ones.

1.1 Background

The military Base at Happy Valley - Goose Bay was established in the 1940s. The military flight training of Allied pilots began in the 1950s. For the duration of the Cold War, the Base served as a staging area to support Allied Forces in Europe. By the late 1960s the strategic importance of CFB Goose Bay had decreased significantly. In the early 1980s the Base grew more active again with the increase in low-level flight training by NATO Allies. In 1986, CFB Goose Bay became a candidate for a NATO Tactical Fighter Training Centre.

Some residents of the Quebec-Labrador peninsula expressed concern about the effects of low-level flight training and the facilities and installations associated with the NATO Centre, specifically with the establishment of live weapons ranges, including an offshore range in the Labrador Sea.

In recognition of this concern, the Associate Minister of National Defence referred the project to the Minister of Environment for public review in accordance with the Environmental Assessment Review Process (EARP).

According to this process, a government-appointed panel, the EARP Panel, establishes guidelines for the preparation of an Environmental Impact Statement. After the EIS is complete, the Panel reviews the document to determine whether or not it meets the guidelines.

a) The Goose Bay EIS of 1989

The Goose Bay EIS was submitted to the EARP Panel for review in 1989. The Panel released a Deficiency Statement outlining the areas where the EIS had to be improved to meet Panel guidelines. In 1990 NATO announced that the plans for the NATO Centre would not proceed. With the cancellation of the proposed NATO Centre, in January 1992 the EARP Panel produced a Revised Deficiency Statement that eliminated reference to the NATO Centre.

b) The EIS of 1994

To respond to the Panel's revised Deficiency Statement, the 1989 EIS was revised. Because the plans for the NATO Centre were cancelled, the project under review for the Revised EIS is military flight training activity. This EIS replaces the EIS of 1989.

Work on the revised EIS began in 1992. It was undertaken by a group of companies headed by MacLaren Plansearch (1991) Limited of Halifax, Nova Scotia, a member of SNC-LAVALIN, and supported by specialized firms from Halifax, Nova Scotia; Montréal, Quebec; Sidney, British Columbia and elsewhere in Canada.

1.2 Report Format

The revised EIS contains a Main Report, consisting of 16 chapters, 16 Technical Reports and a map folio. The Summary comprises seven chapters, including this introductory chapter. Since the Summary only provides an overview of the principal findings of the EIS, the Main Report should be consulted for more detailed information.

2.0 THE PROJECT

2.1 Context of Military Flight Training at Goose Bay

One way in which Canada contributes to the North Atlantic Treaty Organization (NATO) is by permitting member-nations (Allies) to carry out flight training from CFB Goose Bay. The training opportunities available to Allied Air Forces in other countries are inadequate because their airspace is congested. The territory of Labrador and eastern Quebec provides an excellent environment for low-level flight training because it contains a variety of terrain features (hills, valleys). CFB Goose Bay, as a military support base, provides

a range of maintenance and control facilities, full aircrew accommodations and access to retail, recreational and medical facilities.

2.2 The MMOU

The flight training of Allied aircrew at Goose Bay, which has been ongoing for nearly 40 years under various accords, is currently conducted under an agreement called the Multinational Memorandum of Understanding (MMOU). This agreement was signed in 1986 by the air forces of Canada and the following NATO Allies: United States, the United Kingdom and the Federal Republic of Germany. The Kingdom of the Netherlands entered into the MMOU in 1987. The United States withdrew from the agreement in 1991.

The current MMOU has a ten-year term and expires in March 1996. The agreement will not be renewed until the EARP public review has been completed. If the review is not completed by the fall of 1994, there will be insufficient time to negotiate a new accord, and Allied training activities would be expected to end at CFB Goose Bay following the 1995 training season.

2.3 Importance of Military Flight Training

Flight training of Allied aircrew is the primary function of the Base at Goose Bay and has created employment and investment in Central Labrador, particularly in the community of Happy Valley - Goose Bay. Without low-level flight training and the continued presence of the Allies, CFB Goose Bay would probably become a small regional airport; the community of Happy Valley - Goose Bay would experience a significant decline in economic activity and its continued livelihood would be seriously threatened.

In 1992, the Base employed over 1,600 people and Base expenditures totalled almost \$130 million. Approximately 65% of this amount was attributed to the Allies.

2.4 Description of Flight Training

Flight training carried out from CFB Goose Bay consists primarily of low-level training (i.e. training below 1,000 feet above ground level). In designated training areas, pilots may fly as low as 100 feet above all obstacles within 200 feet of track -- broadly speaking, 100 feet above treetops.

Low-level training activities involve navigation, manoeuvring and the release of non-explosive practice weapons against ground targets in a specially designated Practice Target Area (PTA). The release of inert, non-explosive ordnance is limited strictly to the PTA. Pilots also simulate attacks within the low-level flying areas on mock ground targets made of plywood and other materials. The missions are filmed for post-mission analysis and no weapons are released. These targets are referred to as camera targets.

The main purpose of low-level flight training is to teach aircrew the skills necessary to avoid detection by ground-based radars. Before a training mission, aircrew select one or more targets and choose flight paths

to reach them. These flight paths are chosen to follow certain terrain features, such as river valleys, that would reduce their risk of being detected by ground-based radars in a real-life combat situation. Training missions last an average of 75 minutes. On a typical mission, two or more aircraft fly in formation.

2.5 The Project

The project under review consists of a maximum of 18,000 sorties or flight training missions annually, the use of 70 camera targets and two PTAs. Flight training activities take place in two designated training areas covering a total of 100,000 sq km. There are no permanent settlements in the training areas. The locations of the low-level training areas, access corridors and associated facilities are illustrated in Figure 1. The main features of the project are summarized in Table 1.

The Northern Training Area (Area 1) consists of 67,000 km² of diverse wilderness terrain. The Southern Training Area (Area 2) covers approximately 32,000 km². Two airspace corridors link Goose Bay with the northern and southern low-level training areas. Two other corridors link the training areas directly.

Employment at the Base is expected to reach about 1,800 positions, over half of which will be civilian. In addition to providing permanent employment, the Base hosts trainees for two to three weeks periods. The maximum number of trainees stationed at CFB Goose Bay at any time is expected to reach 1,200. Thus, over a 36 week training season, a maximum of 17,280 trainees would pass through Goose Bay.

The construction and rehabilitation program to accommodate project activities is expected to result in an expenditure of \$68.5 million over the life of the renewed MMOU.

2.6 Current Project Activity

2.6.1 Flight Training

Flight training activity at Goose Bay began after the signature of the MMOU in 1986. Therefore the project as described in the previous section has been partially implemented. In 1988, pending the results of the EARP process a temporary cap or ceiling on the number of sorties was established by the Minister of National Defence. Current low-level sorties are between 7-8000 per year.

The Base currently employs about 1,600 people.

Low-level flight training takes place exclusively in Training Areas 1 and 2. One PTA is in use approximately 100 km south of CFB Goose Bay. The PTA is circular and comprises 175 km². Approximately 70 camera targets are distributed throughout the training areas. The Allies have traditionally trained for about 28-31 weeks each year. A summary of current project activities is provided on Table 1.

Figure 1 - Low-Level Training Areas

SUMMARY

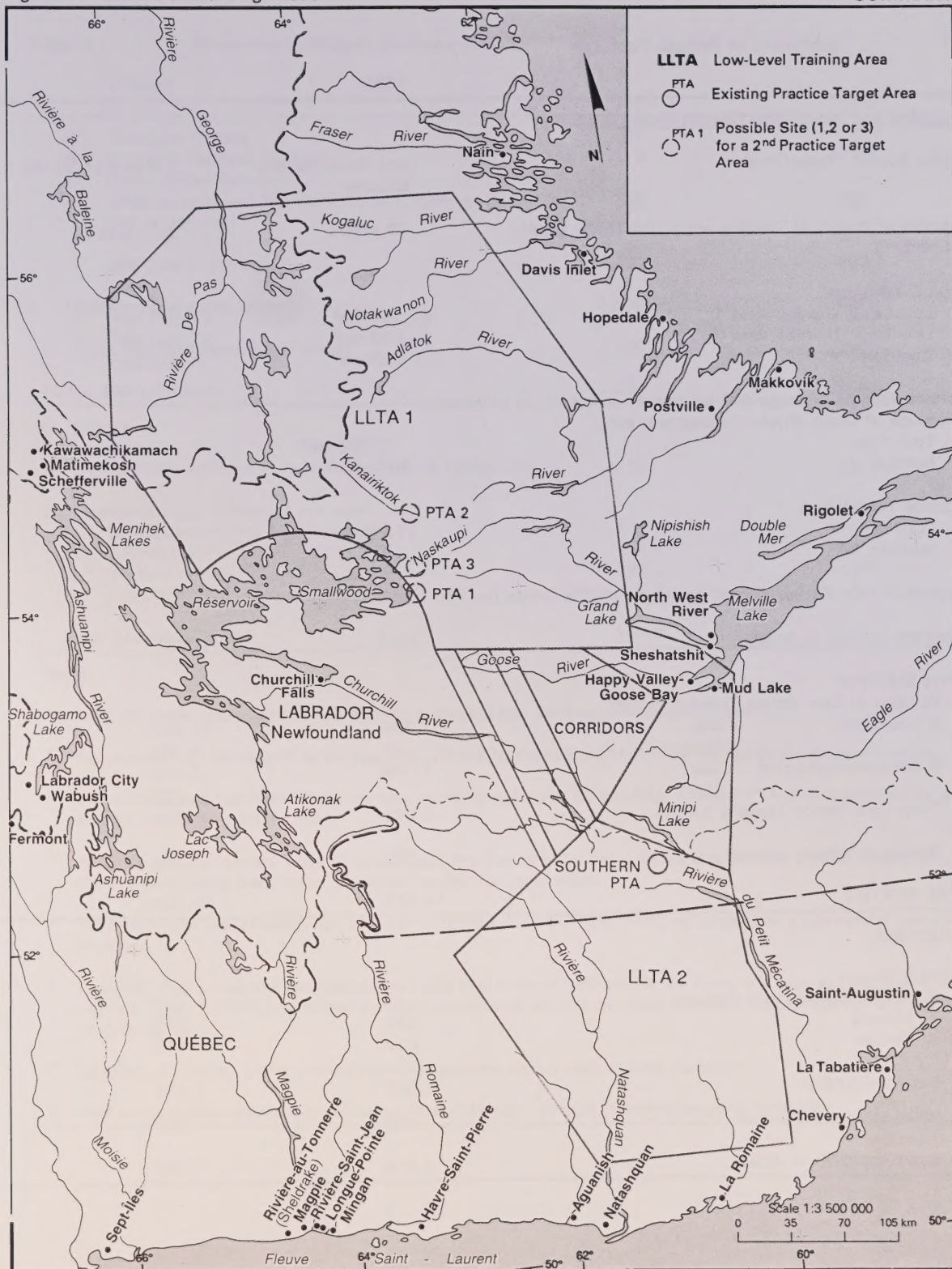


Table 1 Summary of Project Features

	1992	1996 ⁽¹⁾
A) <u>Technical and Operational Characteristics</u>		
1. Flying Season (Timeframe)	end March to mid-October	1 March to 30 Nov.
2. Number of Weeks of Training within the Flying Season (Maximum)	29 weeks	36 weeks
3. Area Dimensions		
a) Low-Level Training Area 1	67,000 km ²	67,000 km ²
b) Low-Level Training Area 2	32,000 km ²	32,000 km ²
c) Corridors	4,200 km ²	4,200 km ²
4. Camera Targets (average 400 m ² /target, composed of plywood mock-ups of tanks, trucks, helicopters, etc.)		
a) Total Size	0.028 km ²	0.028 km ²
b) Number	70 ⁽²⁾	70
5. Practice Target Area		
a) Total Size	173 km ²	473 km ²
b) Number	1	2 ⁽³⁾
6. Number of User Nation Aircraft Deployed at CFB Goose Bay	60	119 ⁽⁴⁾
7. Transient Military (average)	900	1,200 ⁽⁶⁾
8. Flying Statistics		
a) Number of User Nation Training Sorties		
i) Low-Level - Day	7,306	13,900
- Night	49	1,100
ii) Medium/High-Level - Day	1,038	2,705
- Night	0	295
Total User Nation Training Sorties	8,393	18,000
b) Transient Military Aircraft	<u>1,660</u>	<u>1,750</u>
TOTAL SORTIES	10,053	19,750
B) <u>Employment</u>		
1. Permanent		
a) Department of National Defence		
i) Military	450	470
ii) Civilian	610	635
Sub-total (DND)	1,060	1,105
b) Allied Military Personnel	159	180
Sub-total (DND + Allied)	1,219	1,285

Table 1 **Summary of Project Features (Cont'd)**

	1992	1996 ⁽¹⁾
c) Transport Canada	21	21
d) Supply & Services Canada	2	2
e) Public Works Canada ⁽⁵⁾	--	--
f) Other Government Departments and Agencies (including NPF employees)	<u>268</u>	<u>280</u>
Sub-total (C through F)	291	303
Total Permanent Employment	1,510	1,588
2. Total Non-Permanent Employment	<u>180</u>	<u>220⁽⁶⁾</u>
TOTAL EMPLOYMENT	1,690	1,808
C) Finance		
1. Capital Costs (millions \$) for Infrastructure & Equipment	15	26
2. Operating Costs (millions \$ per year)		
a) Salaries, Operating & Maintenance	105.5	116
b) Construction ⁽⁷⁾	5.4	40
c) Jet Fuel	23.0	57 ⁽⁸⁾
d) Petroleum Oil Lubricants Farm Rehabilitation	<u>4.7</u>	<u>0</u>
Total Operating Costs	138.6	231

Notes:

- (1) With the exception of A)2 & A)3, figures in this column are best professional estimates.
- (2) Requirement for 60 targets to be available; 70 will be maintained to provide for environmental restrictions.
- (3) The requirement has been stated but has yet to be approved for funding. Second PTA is estimated to be about 300 km², including safety zone.
- (4) Assumes that a new ally with 25 aircraft and the Canadian Forces with 19 aircraft train at CFB Goose Bay, and the RAF increasing from 20 to 25 aircraft as per the other Allies.
- (5) DND took over responsibility for off-airfield infrastructure in 1989. PWC no longer has a permanent presence at the Base.
- (6) Assumes that a new ally the approximate size of the Royal Netherlands Air Force will train at CFB Goose Bay (see note 4). This 1,200 figure is the maximum anticipated despite the Multinational Memorandum of Understanding permitting more.
- (7) Includes all capital, works and maintenance projects above Base signing authority.
- (8) Fuel consumption estimate based on projection of 1991 actuals including assumed new Ally.

2.6.2 Mitigation Measures

Mitigation measures are steps taken to reduce negative project impacts and enhance positive ones. Following the 1989 EIS, DND developed and implemented a series of mitigation measures. General measures include the enhancement of Base social services programs and the creation of an Environmental Action Plan to ensure the protection of the natural environment. In 1990, DND began an extensive program to avoid low-level overflights of sensitive wildlife species and resource users in the training areas. Current and proposed mitigation measures are discussed in Section 5.5 of this summary.

2.6.2.1 General Measures

A Base environmental action plan was completed in 1993 for CFB Goose Bay. It provides guidelines for the protection of the environment during all activities at the Base, including flight training.

It describes programs to reduce the impacts of air, soil and water pollution, noise disturbance and habitat loss associated with Base activities. The plan also describes staff responsibilities for implementation and coordination of the programs.

In order to mitigate the socio-economic impacts of the project, DND has created and staffed a full-time Social Work Officer position and refined its established Drug and Alcohol Abuse Treatment and Education Program. In accordance with DND policy, the Base has also implemented an Employee Assistance Program (EAP). It is jointly funded by DND and the Public Service Alliance of Canada. The EAP Program is designed as a referral service to assist civilian employees with health or behavioural problems that cause impaired work performance.

2.6.2.2 Avoidance Monitoring Program

In 1990 DND implemented an avoidance program and carried out baseline monitoring surveys to ensure that resource users and sensitive wildlife are avoided by low-level overflights.

The program is structured to maximize the protection of sensitive wildlife. This protection is based on the development of standardized criteria for avoidance of sensitive species. The development of these criteria is carried out with input from the scientific community and federal and provincial resource management agencies. A particular species or habitat is monitored and field data is collected. When the agreed threshold for a particular species is reached, the relevant area is closed to low-level overflights.

To assist in the implementation of the avoidance and monitoring program, DND created and staffed the following positions at the Base:

- Base Environmental Officer;
- Community Liaison Officer;
- Native Liaison Officer;

- Mitigation Coordination Officer;
- Biophysical Effects Coordination Officer;
- Base Hazardous Material Coordination Officer.

The Base has also created the Resource Users Advisory Group (RUAG) to foster an information exchange between the Base and resource users and to address problems associated with flight training activity.

3.0 ENVIRONMENTAL SETTING

This section describes those aspects of the environment that are important to the people of the Quebec-Labrador peninsula. For the natural environment the fish, animals and habitats referred to as Valued Ecosystem Components (VECs) are described. For the human environment, a profile of the inhabitants of the Quebec-Labrador peninsula and their social and economic systems is provided.

3.1 The Natural Environment

3.1.1 Physical Features

The study area is located within the Canadian Shield, a region whose character has in large measure been shaped by the various ice advances; these have levelled the surface and have deposited glacial till in the lowlands and valleys. The climate is subarctic; winters are long and cold, and nearshore marine waters are covered with ice for five to six months of the year; summers are short and cool. Much of the area contains either continuous or discontinuous permafrost.

In Central Labrador, where CFB Goose Bay is located, Lake Melville has a moderating influence on the climate. Temperatures are milder than in the interior of the peninsula and the skies are usually clear and sunny.

Air quality in the Goose Bay area and the LLTAs is good. The level of air pollutants in both Happy Valley - Goose Bay and in the LLTAs meets Canadian standards. The most important air pollution problem in the region is acid rain originating from distant industrial areas.

Water quality in the peninsula is generally good, except immediately adjacent to communities and industries, where localized pollution problems exist. Given their physical and chemical characteristics, the lakes of the region are subject to acidification as a result of acid rain.

3.1.2 Noise

a) Noise Levels Produced by Fighter Aircraft

Military fighter aircraft generate noise levels that may exceed 125 dBA. For purposes of comparison, Table 2 presents the noise levels associated with a number of common activities or settings. For example, a quiet residential area would experience about 40 dBA, while an urban residential area that is twice as

noisy would experience 50 dBA (perceived noise doubles with each 10 dBA increase). A snowmobile accelerating generates 90 dBA, while a light aircraft that is twice as noisy generates 100 dBA.

Table 2 Comparative Noise Levels

Types of Environment	Noise Level (dBA)	Specific Noise Sources
	Pain Threshold	
	130	50 kw siren (30m)
	125	Pneumatic chipper
	Discomfort	
Jet airport/discotheque	120	Train whistle/chain saw
	110	Riding "older" snowmobile under maximum acceleration
	100	Beaver or Twin Otter aircraft taking off at 200 ft. Diesel truck (8 m) or snowmobile
	90	accelerating (5 m)
Noisy urban area/construction	80	Alarm clock
Freeway	70	Sewing machine/vacuum cleaner
	Annoyance	
	60	Conversation/air conditioner
Noisy urban residential area	50	Washing machine
Quiet residential area	40	Refrigerator
Farm	30	Whisper/crickets
Wilderness (no wind)	20	Rustling leaves
	10	Human breathing

The noise levels generated by the type of aircraft that train from CFB Goose Bay are presented in Table 3. As shown in the table, the noise levels actually "heard" at ground from an overflight depend on the distance that separates the aircraft from any given location on the ground. For example, an overflight directly overhead at an altitude of 100 feet produces over 120 dBA at ground level. The noise level decreases to less than 110 dBA (a decrease of over 50%), for an overflight at an altitude of 500 feet. Similar reductions are experienced when the overflight is not directly overhead. For example, the noise level decreases to about 100 dBA (a decrease of over 75%) for an overflight at an altitude of 100 feet that is about 1,000 feet to either side of a ground-based receptor such as a person or a cabin.

Table 3 **Noise Levels from Different Aircraft**

Distance from Aircraft		Aircraft Type, Speed and Noise Level			
Vertical (ft)	Horizontal (ft)	F-4, 450 Knots (dBA)	F-16, 450 Knots (dBA)	Tornado, 420 Knots (dBA)	F-18, 420 Knots (dBA)
100	0	127.7	123.3	124.2	123.0
100	995	101.6	98.5	108.2	107.3
100	1,997	91.3	88.7	89.6	98.6
100	4,999	76.6	74.1	75.5	88.7
500	0	111.8	108.2	109.1	108.2
500	866	104.1	101.0	101.9	101.1
500	1,936	94.4	91.8	92.7	91.8
500	4,975	80.1	77.6	79.0	78.0

Source: Technical Report 1-C.

* 450 knots - 830 km/hr - 520 mph

420 knots - 780 km/hr - 480 mph

A direct overflight (called an "event") at an altitude of 100 feet lasts only a few seconds from the moment the sound of the approaching aircraft is first heard to the moment it can no longer be heard (Figure 2). It is the speed of the event that "startles" people who are directly overflown. By comparison, a direct overflight at a higher altitude or an overflight that occurs a thousand or more feet to either side of an observer may last 30 seconds or more. In this latter case, the startle effect is absent or diminished accordingly.

b) Noise in the Training Areas and Corridors

Table 4 indicates, for current project activities, the proportion of the training areas that will experience various numbers of overflights each month. In the current situation, over 90% of the area will experience 64 overflights or fewer per month (fewer than three overflights per day). For any given location within the training areas, the likelihood of being overflown directly at an altitude of 100 feet would be very low, even if no efforts were made to avoid such overflights. Figure 3 presents the distribution of aircraft sorties in 1992.

Figure 2 - Graphic Representation of an Overflight (Startle Effect)

SUMMARY

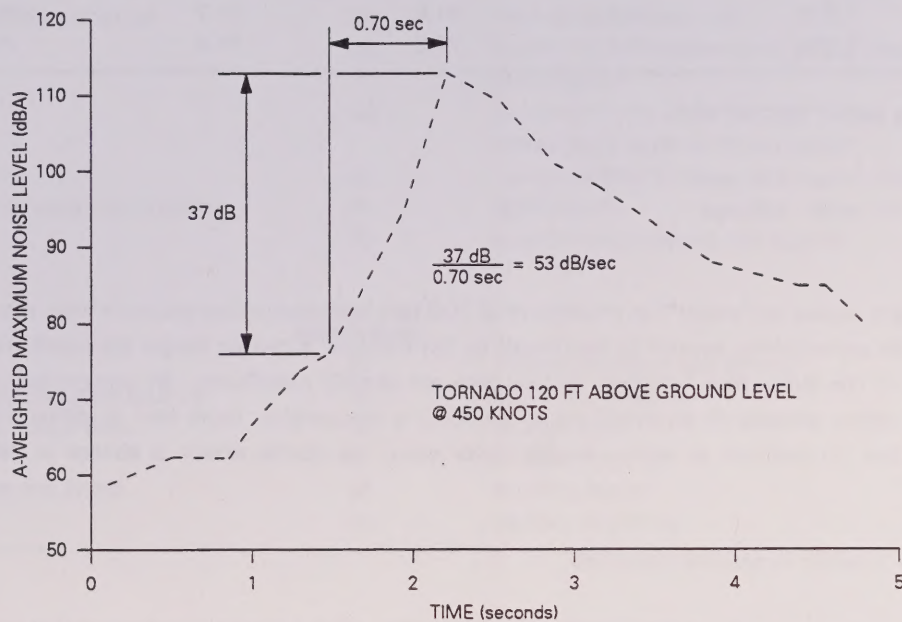


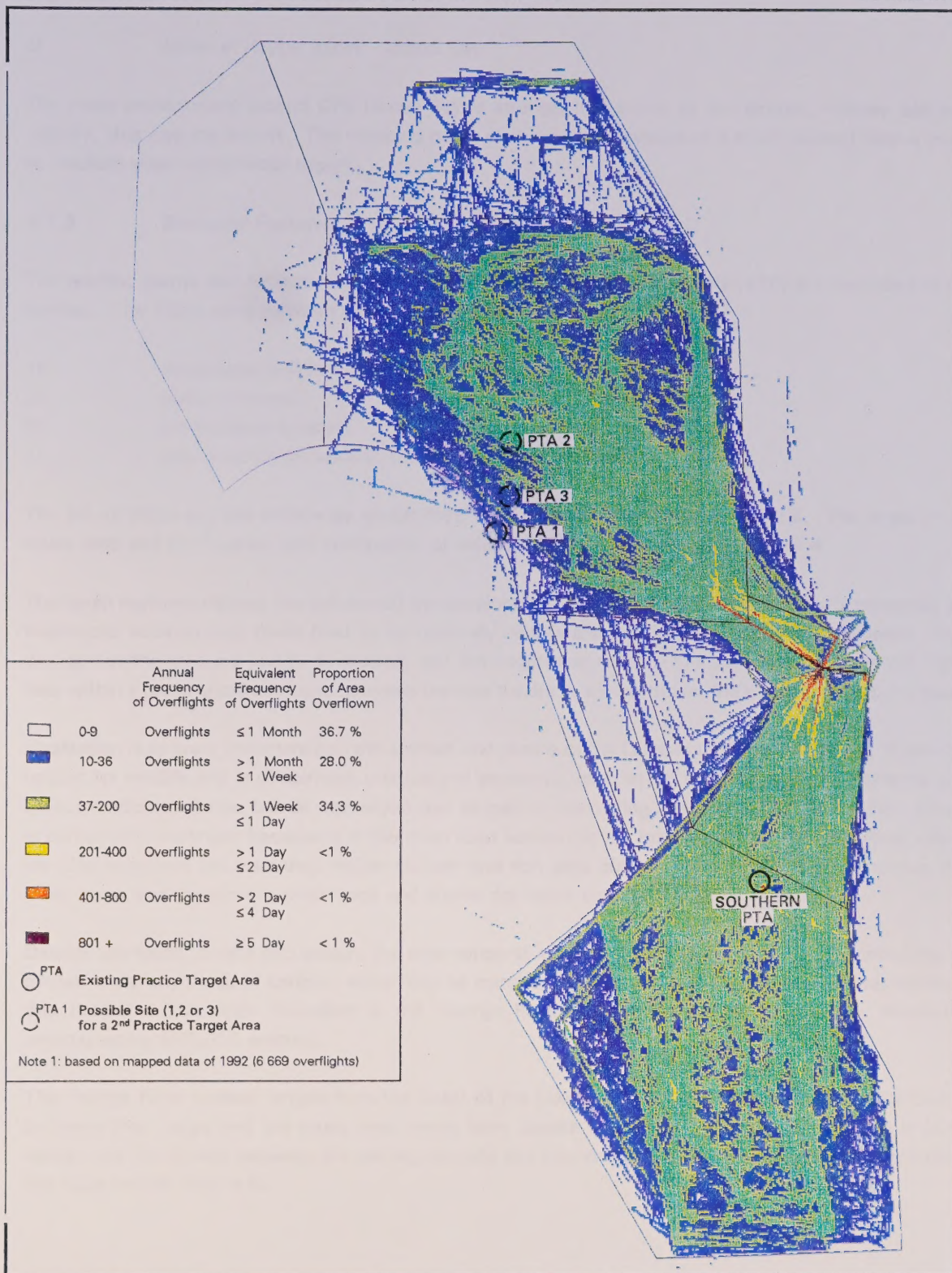
Table 4

Summary of Noise Levels from Aircraft below 1000 Feet and Areas of Low-Level Training Areas Affected

Classification System	Overflight Distribution Mapping				A-Weighted Maximum Noise Levels (ALM)								Cumulative Noise Levels (Monthly)			
	Percentage Area of Low-Level Training Area (LLTA) (based on sorties recorded for mapping purposes)				Expected Number of Aircraft Noise Events per Month Generating ALMs within Various Ranges (based on all sorties as depicted on Figure 11.12)								Equivalent Sound Level	Day-Night Level	Onset-Rate Adjusted Day-Night Level	
	(Overflights per month)	Current Situation (1992)		Future Peak Activity		Total No. of Events (average of range for colour)	<70	70-80	80-90	90-100	100-110	110-120				> 120
		Peak Month Low Season April 1992 592 overflights	Peak Month High Season July 1992 1515 overflights	Peak Month Low Season 1200 overflights	Peak Month High Season 2400 overflights											
White 0-1 overflights	50.2%	39.7%	40.3%	37.4%	0.5	0.1	0.2	0.1	0.1	0.0	0.0	0.0	33.5	33.6	40.5	
Blue 2-5 overflights	27.8%	23.6%	20.1%	13.1%	3.5	0.7	1.4	0.8	0.4	0.2	0.0	0.0	42.0	42.1	48.9	
Green 6-25 overflights	20.5%	32.7%	32.5%	34.2%	15.5	2.6	6.3	3.7	1.9	0.8	0.2	0.0	48.5	48.5	55.4	
Yellow 26-50 overflights	1.3%	3.3%	5.6%	11.4%	38	6.2	15.3	9.2	4.8	2.1	0.4	0.0	52.4	52.4	59.3	
Orange 51-100 overflights	< 1%	<1%	1.3%	3.3%	75.5	12.2	30.5	18.2	9.5	4.1	0.9	0.1	55.3	55.4	62.3	
Burgundy 101 + overflights	< 1%	<1%	<1%	<1%	101	16.5	40.7	24.3	12.7	5.5	1.2	0.1	56.6	56.7	63.5	

Figure 3 - Distribution of Sorties (all altitudes) Current Situation

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c) Noise in Happy Valley - Goose Bay

The noise environment around CFB Goose Bay is strongly influenced by the aircraft, military and non-military, that use the airport. The resulting noise environment is typical of a town located near a small- to medium-sized commercial airport.

3.1.3 Biological Features

The wildlife, plants and habitats identified as Valued Ecosystem Components (VEC) are described in this section. The VECs were selected on the basis of four criteria:

- 1) abundance within the study area
- 2) public concern
- 3) professional concern
- 4) economic importance to the people of the study area

The list of VECs and the criteria by which they were selected are shown in Table 5. The limits of the study area and the location and distribution of selected VECs are illustrated in Figure 4.

The harsh northern climate has influenced the development and productivity of the region's terrestrial and freshwater ecosystems; these tend to be relatively simple and low in productivity and diversity. Soils throughout the area are poorly developed, and the vegetation reflects this severity. Much of the region falls within a broad transition zone between the true tundra to the north and the boreal forest to the south.

Vegetation is of great importance to the animals and people of the Quebec-Labrador peninsula. It provides habitat for wildlife and is of spiritual, cultural and economic value to many of the region's residents, who collect medicinal plants, berries and wood fuel as part of harvesting activities. The thick lichen growth is particularly important because it is the main food source for the region's caribou herds. River valleys are also important because their milder climate and rich soils support more productive vegetation than other areas and therefore provide food and shelter for many birds and animals.

Despite the harsh climate and terrain, the area supports a broad diversity of wildlife species including the ranges of several herds of caribou, which can be considered the dominant land mammal characteristic of this habitat. The most abundant is the George River herd of barren-ground caribou, numbering approximately 500,000 animals.

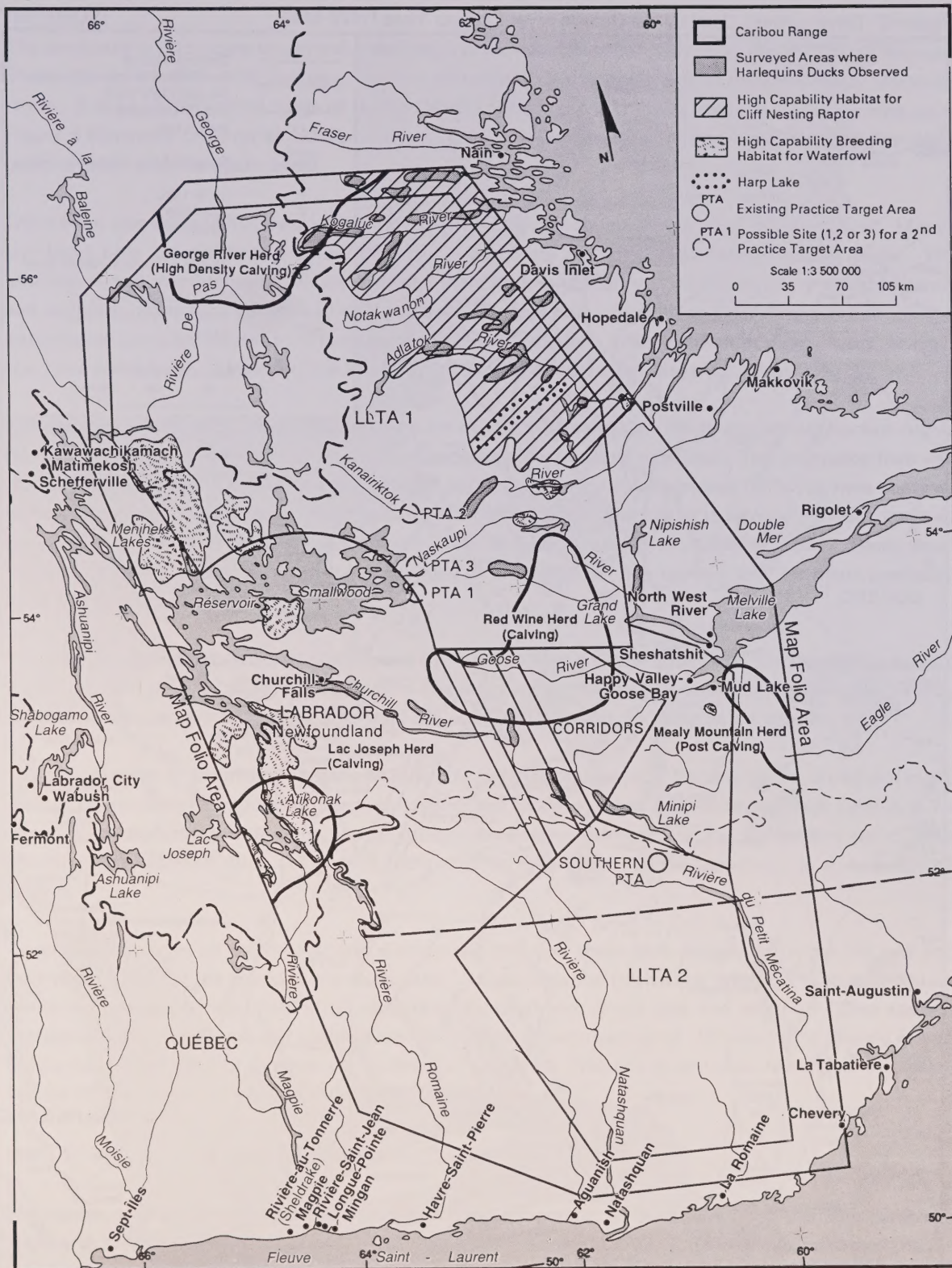
The George River caribou ranges from the coast of the Labrador Sea west to Hudson Bay. The overlap between their range and the study area varies from season to season. The greatest overlap is in the winter, but the overlap between the calving grounds and the northwestern corner of LLTA 1 is considered the most critical (Figure 5).

Table 5 **Valued Ecosystem Components, and the Main Sources of Concern that Influenced the Selection Process**

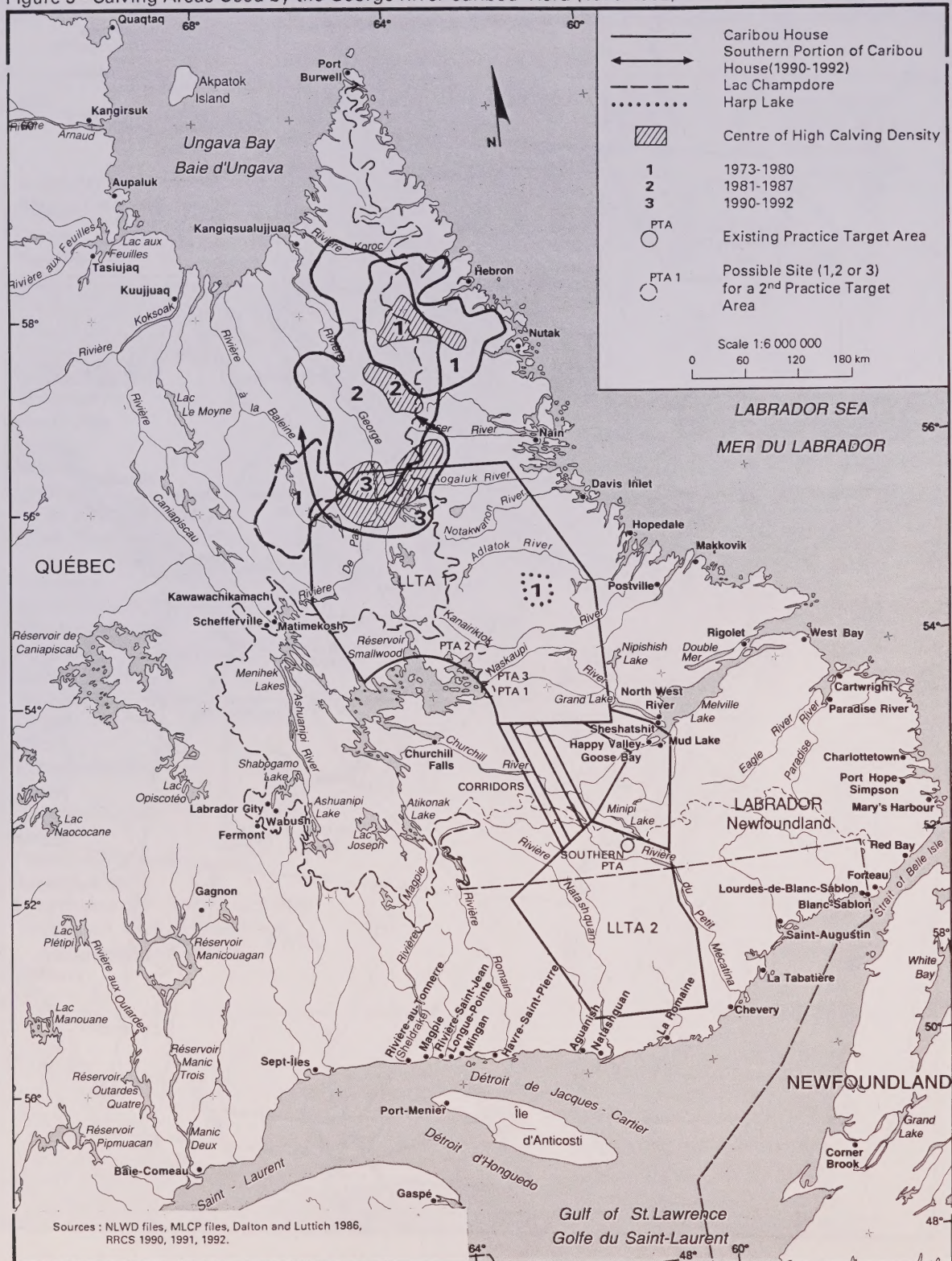
VEC	Local Social Concern	Ecological/Scientific Concern	Concerns of Society at Large (High Social Recognition)
Caribou	X	X	X
Moose	X	X	
Black Bear	X	X	
Wolf			X
Marten	X		
Wolverine		X	
Mink	X		
River Otter	X		
Coloured Fox	X		
Arctic Fox	X		
Lynx	X		
Beaver	X	X	
Muskrat	X		
Hares (Snowshoe, Arctic)	X	X	
Small Mammals (Lemmings, Voles, Mice, Shrews)		X	
Porcupine	X		
Seals (Harp, Ringed)	X		
Peregrine Falcon		X	X
Gyr Falcon			X
Golden Eagle			X
Bald Eagle			X
Osprey			X
Owls		X	X
Canada Goose	X		
Ducks	X		X
Harlequin Duck		X	
Loons		X	
Ptarmigan/Grouse	X	X	
Passerine Birds		X	
Freshwater and Diadromous Fish	X		X
Vegetation (includes food and medicinal plants)	X	X	
Lichens		X	
River Valleys	X	X	

Figure 4 - Distribution of the Selected VECs

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The peninsula is also home to several small herds of woodland caribou, which total about 3500 animals. These include the 600 - 800 caribou of the Red Wine herd and the smaller Lac Joseph and Mealy Mountain herds. A large portion of the range of the Red Wine caribou herd is in the northern low-level training area. Figure 6 illustrates the overlap between the ranges of the George River, Mealy Mountain, and Red Wine caribou herds and the study area.

Other large mammals to be found within the region include moose, black bear, polar bear and wolf. Moose and black bear are distributed at low densities; polar bears are not present in the training areas. The abundance and distribution of wolves, on the other hand, is thought to be influenced by the abundance and seasonal movement patterns of caribou, their principal prey. In addition to the large mammals, the study region provides habitat for a number of species of furbearers including marten, mink, fisher, ermine, fox, lynx and beaver. These are the mainstay of the Labrador/Quebec trapping industry.

The snowshoe hare, arctic hare and porcupine are all identified as VECs. These animals are hunted mainly by local residents for sport and to supplement subsistence harvesting activities. The snowshoe hare and the porcupine are found throughout the forested parts of the study area, whereas the arctic hare confines its habitat mainly to the tundra. Many species of small mammals, belonging to several different families, are present in the study area. Moles, shrews, mice and lemmings are identified as VECs. These small mammals play an important role in the ecosystem of the region as they provide food for many predatory birds and mammals.

The region supports a diversity of birdlife, and the rivers, streams and lakes provide rich habitat for aquatic fauna. Birds of prey, or raptors, found within the area include bald eagles, ospreys, rough-legged hawks, gyrfalcons and peregrine falcons. Of these, the peregrine falcon is an endangered species.

The large number of lakes and wetlands provide breeding habitat for loons, Canada geese, ducks and many species of shorebirds. Important breeding, staging and moulting areas include Snegamook Lake in LLTA 1, and the wetland surrounding the western part of the Smallwood Reservoir and the eastern part of Lake Melville. The harlequin duck, which is found mainly on the eastern coast of Labrador, is an endangered species.

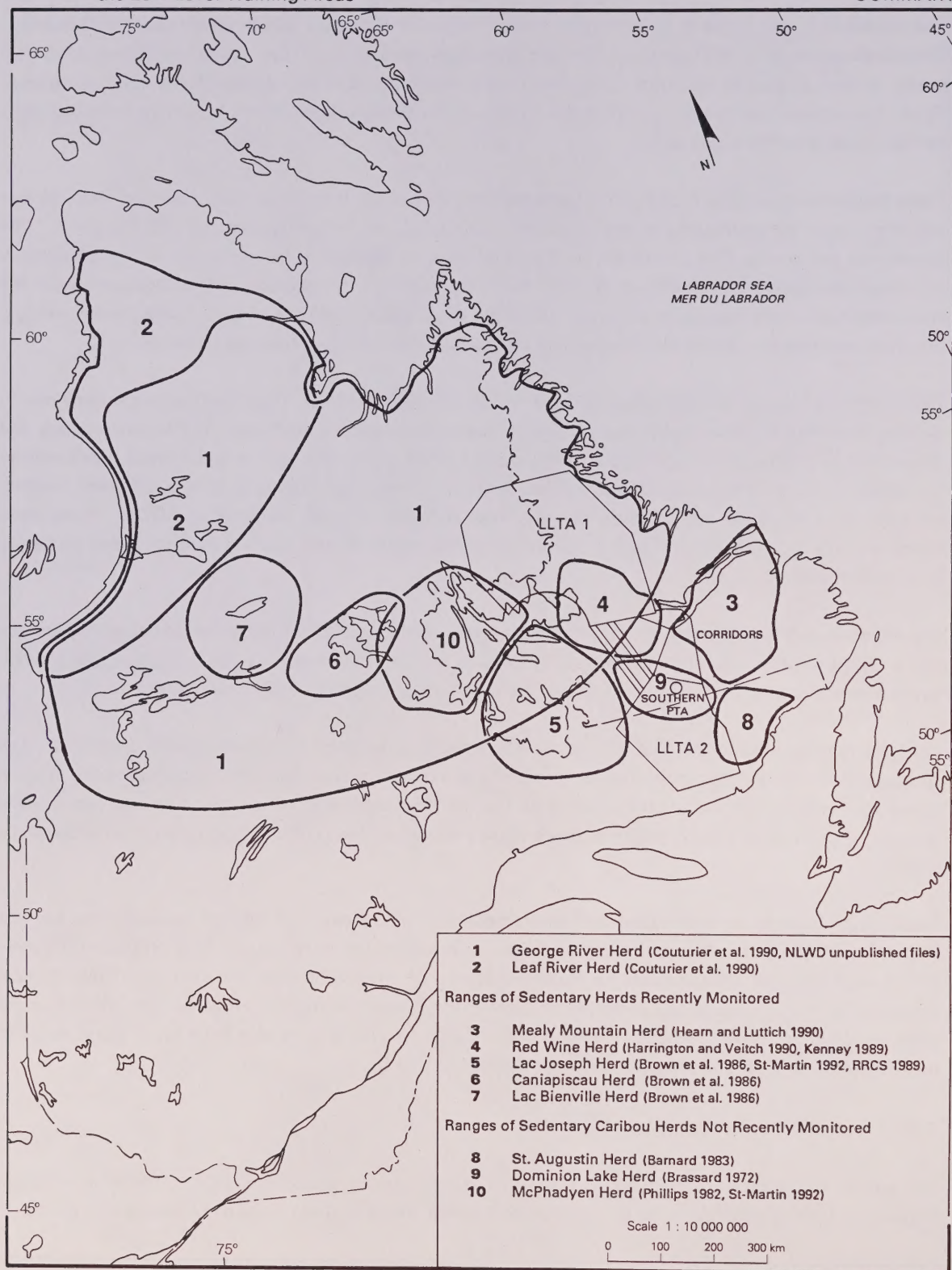
Twenty-nine species of freshwater and diadromous fish (i.e. those that migrate between the sea and freshwater habitats) are found in the study area. At one time the freshwater bodies and coastal waters of the study area provided habitat for abundant stocks of cod, arctic char and salmon. These species sustained both commercial and subsistence fishing throughout the region. However, the decline in cod stocks has halted the cod fisheries on the coast of Labrador. There have also been fewer salmon, which has led to the decline of commercial salmon fishing.

3.2 The Human Environment

The human environment is described in terms of three geographic areas: The Quebec-Labrador peninsula in general; Central Labrador; and the Low-Level Training Areas (LLTAs). A general description of the

Figure 6 - Distribution of Caribou Herds in Relation to the Study Area and the Low-Level Training Areas

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demographic characteristics, health and socio-economic systems of the inhabitants of the Quebec-Labrador peninsula is provided. Because the Base is in Central Labrador, a more detailed description of the inhabitants of this region is given, with specific reference to the Base as a distinct part of the community of Happy Valley - Goose Bay. The recreational, commercial and subsistence harvesting of resources that occur in the LLTAs is also discussed.

3.2.1 Quebec-Labrador Peninsula

a) The people

The area is home to several distinct peoples; these include the Inuit, the Montagnais, the Naskapi, Métis and settlers, and newcomers. The first to arrive were the ancestors of the Montagnais and Naskapi and some thousands of years later, the ancestors of today's Inuit. The second wave of immigrants originated in Europe, predominantly in Britain and France. These settlers came to Labrador in the 1700s as fur traders, fishermen and carpenters and blended their ways with those of the Indians and Inuit of the area. The settlement of the Quebec North Shore came later when the provincial government intervened in the affairs of the Hudson's Bay Company, permitting individuals to build fishing establishments. As a result, between 1850 and 1865, 20 permanent communities were established on the North Shore east of Sept-Iles. The newcomers are those who have come to the area over the last fifty years; these include the military and all who have moved into the area to work on various resource and development projects.

By 1991 just over 51,000 people inhabited the approximately 60 communities that are located in or near the study area (Figure 7). Of these communities, only seven had a population of more than 1,000 persons. Happy Valley - Goose Bay and Labrador City, with populations of 8,610 and 9,061 respectively, were, and are, the most significant.

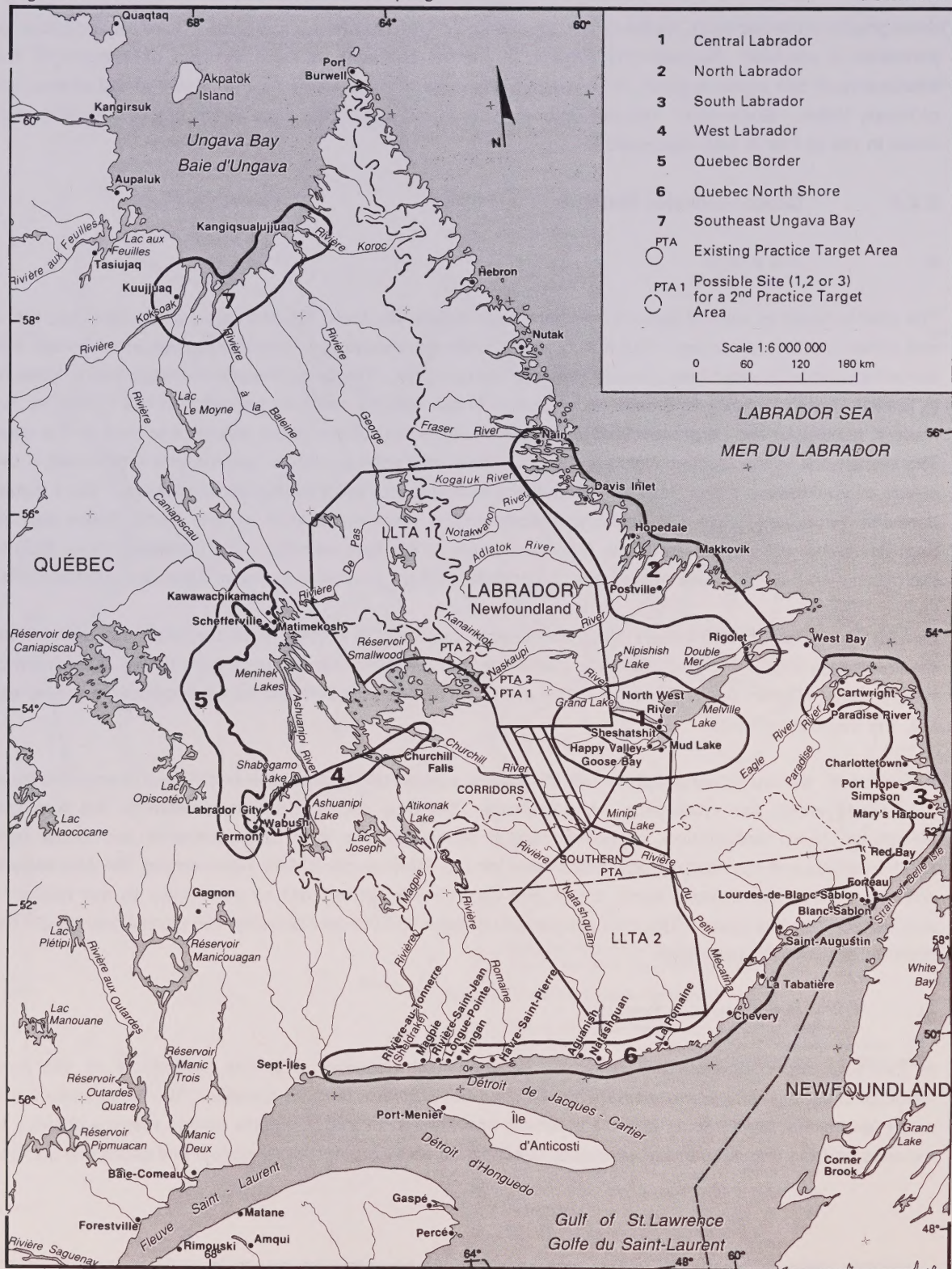
As indicated, the aboriginal peoples were the earliest settlers of the area, and at different times they have used lands within the study area. Unfortunately, the Innu Nation (formerly known as the Naskapi-Montagnais Innu Association, or NMIA), which represents the Innu of Sheshatshit and Davis Inlet (Utshimassit), and the Conseil des Atikamekw et des Montagnais (CAM) representing the Montagnais communities of the Quebec North Shore and Schefferville, chose not to participate in the fieldwork associated with this study. The Inuit peoples of northern Quebec and Labrador did participate, as did the Naskapi of Kawawachikamach.

b) Administrative Setting

In Labrador most services are delivered by provincial agencies with the assistance of the local municipalities and incorporated towns. In Quebec the situation is more complex. The existence of two major land claims agreements and the presence of a number of status Indians means that the delivery of services and the management of resources is administered by provincial, municipal and aboriginal bodies.

Figure 7 - Distribution of Settlement Groupings

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Virtually all of the land within the training areas is federal or provincial Crown Land.

c) **The Economy**

The economy of the Quebec-Labrador peninsula is not diversified. Most communities in the region depend on a limited resource base. Many residents are employed in the precarious, resource-based economic sectors of mining, forestry and fishing. The vulnerability of the local economy is illustrated by the fact that between 1987-88 and 1991-92 social assistance payments in Labrador increased by 60 per cent. This increase is attributed to the downswing in the coastal fishery and the exhaustion of unemployment benefits by unemployed miners in West Labrador.

Throughout the peninsula, the wage economy is supplemented by natural resource harvesting (e.g. hunting, trapping, fishing) for local consumption and trade.

The establishment of a military presence at Goose Bay and its evolution over the years had a major influence on the structure of the economy of the Quebec-Labrador peninsula, particularly in Central Labrador. Over the years the Base and the local economy it supports have provided a relatively stable source of employment for peninsula residents.

d) **Constitutional and Land Claims Issues**

The rights of Canada's aboriginal people are recognized and affirmed by Section 35(1) of the Constitution Act of 1982. Based upon their land-related interests, groups have submitted land claims statements to Federal and Provincial governments. Some have been settled, some are currently under negotiation and another is expected to proceed to negotiation status shortly.

Land claims are not now, neither should they be, linked to the realization of the project under consideration. To date, Canada has maintained not only that development existing before the start of negotiations should be respected but that there should not be a total freeze on new developments while claims are being negotiated. Accordingly, in the Letter of Referral, dated 13 February 1986, issues of that nature, such as aboriginal land claims, were specifically excluded from the Environmental Review.

DND can only urge the responsible authorities to progress to resolution of the claims. Once the land claims are resolved, they will be constitutionally protected and, as such, DND will abide by the terms of the new arrangements that will be put in place.

3.2.2 Central Labrador

There are four communities in Central Labrador, namely North West River, Mud Lake, Sheshatshit and Happy Valley - Goose Bay, but the latter is by far the largest. Approximately 85% of the population of the area live in Happy Valley - Goose Bay, a town that has become the administrative, transportation and service centre for much of the rest of Labrador. The local economy is very much service-oriented; neither

the primary sector nor the manufacturing sector is significant. The Base is the main employer in Central Labrador. In 1992 it provided employment to over 1,600 people and generated \$105 million in salaries, operation and maintenance expenditures and over \$5.4 million in construction activity. Because of the investment and employment created by the Base, per capita incomes are on average higher and unemployment rates lower for the people of Central Labrador than for other residents of the Province of Newfoundland.

Incomes in the smaller communities of Central Labrador, especially Mud Lake and Sheshatshit, are significantly lower than those of either Happy Valley - Goose Bay or the province, reflecting the subsistence nature of much of the economic activity in those areas.

The total number of occupied dwellings in Central Labrador, excluding Base accommodation, is approximately 2,311 units. The housing on the Base consists mainly of single and multiple dwellings that house military personnel and their families and civilians employed by the military and other government departments. Surplus units are leased to local residents. The availability of surplus units changes according to the needs of the military.

The availability of rental accommodation in Central Labrador is limited, particularly in the community of Happy Valley - Goose Bay. There are waiting lists for government subsidized housing, and the few private rental units that are available are often in poor condition or too expensive for local residents.

Responsibility for primary and secondary education in the area resides with two school boards, namely the Labrador East Integrated School Board and the Labrador Roman Catholic School Board. Between them they are responsible for nine schools, of which six are located in the town of Happy Valley - Goose Bay. Two of these, St. Michael's Elementary and Goose High School, are located on the base. The latter is operating at capacity and the elementary school is expected to reach capacity within the next two to three years.

The Labrador Community College and an extension of Memorial University of Newfoundland provide opportunities for college and university programs. The university has a mandate to identify community needs, to respond with appropriate programs and to request funding to implement agreed-upon programs. The college offers special programs and services whereby training is delivered to meet the requirements of business, industry and government agencies. With present enrolment at 250 students, the facility is already operating at capacity.

Melville Hospital, located on the Base, serves a catchment area greater than Central Labrador; it fulfils a number of special functions that reflect the needs and circumstances of its location. This distinguishes it from a simple regional hospital. It is, for example, designated as a tuberculosis treatment centre. The present facility is acknowledged both to have outlived its useful life and to be in an inappropriate location, and consensus exists on the need for a new central facility which would serve both the civilian and military populations. Other medical services in Central Labrador include those provided on the Base for military

personnel and the Harry L. Paddon Memorial Home in Happy Valley, which is the only nursing and long-term care institution serving the needs of the elderly; it is at present operating at capacity.

A comprehensive range of social services and programs, many of them provided directly by the Newfoundland and Labrador Department of Social Services, is available to the inhabitants of the area through two offices: one in Happy Valley - Goose Bay and one in Sheshatshit. In addition to the programs offered by the Department of Social Services, services also exist to cater to specific segments of the population. The Happy Valley Women's Centre, operated by the Mokami Status of Women Council, offers counselling and crisis support services throughout the region. Libra House, also located in Happy Valley, provides the region's only women's shelter. A Family Resource Centre, located on the Base, is operated by DND to provide information programs, counselling on family problems, and referrals to other services, primarily to DND employees and dependants.

The residents of Happy Valley - Goose Bay are at present well served in terms of both indoor and outdoor recreational and community facilities. The availability, extent and diversity of facilities in relation to the population is above average for the province, but facility managers, users and others are quick to point out not only that the existing facilities are used to capacity, but that demand for new spaces and for upgraded facilities is rapidly increasing from all sectors of the population. The facilities are owned or operated by either the town, CFB Goose Bay or the province. The public has access to these facilities.

In terms of public utilities and infrastructure, the existing systems serve current population levels effectively, but there is little capacity to accommodate additional growth. For example, difficulties have been experienced in keeping town water reservoirs full, particularly in winter when peak loadings occur. As a consequence, additional sources of drinking water have been developed. The trunk sewer in Happy Valley-Goose Bay has excess capacity, but it discharges its load untreated into the Churchill River; the sewer system in North West River discharges untreated effluent into Lake Melville.

Despite the importance of the wage economy in Central Labrador, the land and its resources retain their significance for a high percentage of local people, particularly those in North West River, Mud Lake and Sheshatshit. For the Innu of Sheshatshit in particular, resource harvesting is an integral part of their culture. The Innu harvest throughout Central Labrador and, in some cases, beyond.

Traditionally, people trapped in the fall and winter, went sealing in the spring and in the fall, and fished during the summer. Caribou hunting took place between trapping seasons at any time from the end of December to the beginning of March, but usually in January. Harvesting patterns are not and cannot be considered static; they alter in response to changes in the stock and to changing social circumstances. For example, the majority of land users in Happy Valley - Goose Bay are primarily wage earners and consider themselves to be recreational resource users. They pursue harvesting on weekends and during vacation time. In contrast, harvesting remains important to the residents of the smaller communities as a source of food; in North West River, for example, almost every family keeps both traps and nets, and most residents rely heavily on country food for a significant proportion of their diet. The situation is similar in the other small communities.

Caribou hunting patterns in the area respond to the size and migration patterns of three herds: the George River herd, the Mealy Mountain herd and the Red Wine herd. The first is by far the most important. The closer it comes to Central Labrador, the greater the harvest will be. The size of the Mealy Mountain herd has increased in recent years, but will not yet sustain a hunt of any size. The Red Wine herd has been closed to legal hunting since 1970, and no change in that status is anticipated.

Many factors may affect harvesting practices in Central Labrador, but harvesting for most residents will remain primarily recreational. If migratory routes take wildlife away from the communities, or if caribou population levels are low, resource harvesting levels will drop. On the other hand, improvements in local means of transportation may increase the distances that can be travelled in a given period of time or may provide new access to areas of rugged terrain previously inaccessible.

3.2.3 Outlying Areas

With the exception of those communities in West Labrador and along the Quebec border that depend to a large extent on mineral deposits or on the operation of the Churchill Falls hydro project, most of the outlying communities are small, that is, have fewer than 500 inhabitants. Their economic survival is based on a combination of resource harvesting, transfer payments and wage employment. Despite resource depletion, the commercial fishery remains important to the communities of the Quebec North Shore and of the Labrador coast; in other areas trapping can generate an important cash supplement, but in most of the communities there are few opportunities for wage employment. There are two alternatives for the future: either jobs are created locally by appropriate economic development initiatives, or individuals, especially the young, may seek employment elsewhere, including Goose Bay. As a result of these circumstances, the studies and fieldwork undertaken in the outlying areas focused primarily on two topics: first, on those land use activities that have the potential to be affected by the project, and second, on community concerns and aspirations related to the project.

The harvesting of natural resources is important for many on the Quebec-Labrador peninsula. Fishing, foraging, berry picking, trapping and hunting take place throughout the region. The importance of any specific resource activity varies between communities and households. For some, resource harvesting is culturally significant and contributes to domestic product and income. For outfitters and guides who organize fishing and hunting expeditions, the resource base is their main source of income.

Based on the consultations that were undertaken in each community, a degree of importance was assigned to the harvesting activities undertaken within the map folio area (Table 6). The activities were ranked according to the following scale:

- Major importance (Class 1): The activity provides both a moderate to major source of income or food to a community or region (i.e. group of communities), and participation in the activity is viewed by the community (or region) as contributing significantly to their cultural identity or way of life;

Table 6 Resource Use Importance by Activity and Community (for Communities that Participated in Research for the EIS)

	IMPORTANCE RANK						
	Fishing	Caribou/Moose Hunting	Trapping	Small Game Hunting	Sealing	Waterfowl Hunting	Wood/Berry Gathering
Central Labrador							
Happy Valley - Goose Bay	3	3	3	3	3	3	3
North West River	2	3	2	2	3	2	3
Mud Lake	1	3	2	2	3	2	3
North Labrador							
Nain	1	1	2	2	3	3	3
Hopedale	1	1	2	2	3	3	3
Makkovik	1	1	2	2	3	3	3
Postville	1	1	2	2	3	3	3
Rigolet	1	2	2	2	3	3	3
South Labrador¹							
Strait of Belle Isle ²	3	3	3	3	-	3	-
Charlottetown ²	-	3	3	-	-	-	-
Port Hope Simpson ²	3	3	3	-	-	3	-
Paradise River	1	2	1	2	3	3	3
Cartwright	1	2	2	2	3	2	3
West Labrador							
Labrador City and Wabush	3	3	3	3	-	3	3
Churchill Falls	3	3	3	3	-	3	-
Quebec Border							
Fermont	3	3	3	3	-	-	3
Kawawachikamach	1	1	1	1	-	1	-
Schefferville (non-aboriginal)	3	3	-	3	-	3	-
Quebec North Shore							
Sheldrake & Rivière-au-Tonnerre	2	-	2	-	-	-	-
Rivière-Saint-Jean & Mingan	2	-	-	-	-	-	-
Aguanish & Natashquan	1	2	1	2	-	-	-

Table 6 Resource Use Importance by Activity and Community (for Communities that Participated in Research for the EIS) (Cont'd)

	IMPORTANCE RANK						
	Fishing	Caribou/Moose Hunting	Trapping	Small Game Hunting	Sealing	Waterfowl Hunting	Wood/Berry Gathering
La Romaine	2	2	1	2	-	-	-
Baie-des-Moutons & La Tabatière	2	2	1	3	-	-	-
Saint-Augustin	2	2	1	3	-	-	3
Vieux-Fort & Saint-Paul	2	2	1	3	-	-	3
Blanc-Sablon & Brador	2	2	2	3	-	-	-
Southeast Ungava Bay³							
Kuujuuaq	-	-	-	-	-	-	-
Kangiqsualujjuaq	-	-	-	-	-	-	-

- Notes:
1. Fishing is of major importance to communities throughout this region, but the fieldwork focused upon the fishing that took place in fresh as opposed to offshore waters.
 2. Activities such as sealing, waterfowl hunting and wood/berry gathering, which tend to take place on coastal lands, were not recorded for the Strait of Belle Isle area, Charlottetown, or Port Hope Simpson.
 3. Harvesting is of major importance to the Inuit in both Kuujuuaq and Kangiqsualujjuaq, but it occurs outside the map folio area.
 4. Where a community either does not participate in an activity or participates in that activity outside the study area it has not been categorized in accordance with the above (it is indicated above as -).

- Moderate importance (Class 2): The activity provides a minor to moderate source of income or food to the community or region, and participation in the activity tends to be moderate to high, or the activity is viewed by the community as providing work at a time of year when there are few, if any, other possibilities;
- Minor importance (Class 3): The activity provides a comparatively minor contribution to the total income or food intake of a community or region, though the activity itself may be viewed by the community as important to the annual harvesting rhythm.

In North Labrador, nearly everyone relies in one way or another on access to, and use of, both land and water. There are, in fact, few alternative ways by which to earn a living, particularly in the communities of Hopedale, Postville and Davis Inlet (Utshimassit). Fishing, hunting and trapping are central to the subsistence economy; fish and caribou are major food sources for inhabitants throughout the area.

Until the moratorium was placed on cod fishing in 1992, the communities of South Labrador depended on commercial cod fishing. Harvesting of berries, mammals and birds was of minor importance for most communities in the region. The cod moratorium may increase local use of the land and wildlife resource base. The importance of activities such as caribou and moose hunting, trapping and small game hunting may increase as less reliance is placed on income from commercial fishing.

The three communities in West Labrador of Labrador City, Wabush and Churchill Falls each exist because of the resources of the area; as communities, they are truly different from other communities in Labrador. All enjoy relative prosperity and high employment rates. As a result, the land use activities pursued by the inhabitants are almost purely recreational; family income may be supplemented by the proceeds of trapping, or indirectly through hunting and fishing, but there is no necessity to use the land to subsist.

Although the economy of the Quebec border communities is largely based on mineral exploration, many in both Fermont and Schefferville pursue resource harvesting activities, particularly fishing, but for recreational purposes, not for subsistence. In contrast, the two aboriginal communities, the Montagnais community of Matimekosh at Schefferville and the Naskapi community of Kawawachikamach, depend on resource harvesting for both income and subsistence.

The land and water resources of the Quebec North Shore, although in large measure highly regulated, are significant to the well-being and way of life of all in the area. The Lower North Shore, for example, depends for its very existence on the fisheries; the economy of Minganie may be more diversified, but the fishery continues to be the main source of employment for the smaller communities. Inland, the legislated distribution of trapping territory has tended to constrain land use in Minganie. The Montagnais have long used the lands of the area; although land use today depends on many factors, including the synchronization of harvesting activities with paid work, hunting and trapping remain important as sources of food, money and cultural identity.

The Inuit of Kuujuaq and Kangiqsualujuaq are unlikely to be directly affected socially or economically by the project. Rather, any impact will be related to their use of the land and their harvesting activities, which have in the past extended over much of the Quebec-Labrador peninsula. Today the economy of the two communities is based on resource harvesting and on the acquisition of income through wage employment, independent small business ventures and transfer payments. Although many species are taken by the Inuit, caribou is the most important and reflects the location of the communities in relation to the spring and fall migration routes of the George River herd. Any adverse project related impact on caribou would have considerable economic and social consequence on the communities.

4.0 ISSUES AND CONCERNS

Individuals and groups from across the Quebec-Labrador peninsula and elsewhere in Canada have expressed their views and perceptions of the project.

This section summarizes the principal issues raised by the public and addressed in the EIS. Issues and concerns have been raised by individuals and groups from across the Quebec-Labrador peninsula and elsewhere in Canada. Certain of the issues were originally raised in 1986 are no longer as valid as they were then. Nevertheless, the issues and concerns are presented here largely as they were originally expressed by the public. Certain of the issues are not directly related to the project. Others are related in whole or in part to the proposed NATO Training Centre that has now been cancelled. Most of the concerns raised have been or will be addressed through appropriate mitigation and/or monitoring.

Issues guide the environmental assessment process. More specifically, they determine which aspects of the environment are described to enable the assessment of project impacts, and suggest what steps could be taken to enhance the benefits of the project and reduce its adverse effects. There are two types of issues: social and biophysical. The most important issues are described briefly below.

4.1 Social Issues

Social issues have been divided into three broad categories: In-Town issues, On-the-Land issues and General Issues.

4.1.1 In-Town Issues

Happy Valley - Goose Bay is a military town. The military Base is the community's largest single employer and the military personnel and dependants who live on the Base comprise almost a third of the town's population. The socio-economic issues related to the presence of the military Base in the community of Happy Valley are defined as "In-Town" issues.

The Base is viewed as a positive aspect of the community because it is the mainstay of the local economy and provides residents with access to Base recreational facilities. Concern has been expressed that DND should expand its efforts to provide employment and business opportunities to local residents.

Local residents have also expressed concern about the ability of municipal and regional infrastructure, services and housing, which are already at or near maximum capacity, to meet any additional requirements that may result from the project.

Finally, residents perceive a need to continue to improve relations and understanding between military personnel and civilians. DND shares this objective.

4.1.2 On-the-Land Issues

On-the-land issues relate to human activities in the LLTAs. Specifically, there is concern that noise from low-level flying may interfere with resource harvesting activities. It is also feared that resource harvesting could be adversely affected by the project if aircraft noise or pollutants from aircraft adversely affected the quality, distribution and quantity of wildlife species harvested.

There is also concern that the presence of military personnel at CFB Goose Bay and the growth of the civilian population of Happy Valley - Goose Bay could increase competition for the harvesting of natural resources (hunting, fishing, trapping). Increased competition particularly concerns those who gain a portion of their revenue from harvesting or who rely upon "country food" to supplement store-bought food.

Local residents have also said that the presence of military aircraft in the LLTAs may limit the development of wilderness tourism and outfitting.

4.1.3 Issues Unrelated to the Project

Several issues that have little to do with the project confront the people of the Quebec-Labrador peninsula and the provincial and federal governments. One issue relates to the ongoing cultural change experienced by aboriginal people as a result of contact with Europeans, Canadians and Americans. This has been a process of acculturation. Concern has been expressed that the presence of CFB Goose Bay and of flight training in the Quebec-Labrador peninsula could adversely affect the region's aboriginal people by furthering a process of forced acculturation. There is also concern that the project could interfere with land claims negotiations.

4.2 Biophysical Issues

Biophysical issues relate to the dynamism of the region's ecosystem and the need to ensure its protection and conservation.

4.2.1 Ecosystem Dynamism

Local residents and members of the scientific community have expressed concern that wildlife subjected to low-level overflights could be adversely affected by aircraft noise, exhaust emissions and the establishment of ground based installations. Possible direct consequences of exposure to noise could

include changes to species distribution and migration patterns and wildlife mortality. Indirect consequences could include a decline in animal health as a result of changes in distribution or migration patterns.

There is also concern that exhaust emissions could pollute the region's air and water, contaminate vegetation and that the consumption of pollutants by wildlife could pollute the food chain. The human environment could also be affected.

4.2.2 Protection and Conservation

Parks, reserves, sanctuaries and archaeological sites within the region have been identified by various federal and provincial government agencies. One issue raised is the need to maintain the diverse riches of the Quebec-Labrador peninsula through the protection and conservation of these designated areas. There is concern that the activities associated with military flight training may have adverse effects on these designated sites, of which there are none in the training areas, or on the designation of such sites in the future.

5.0 PROJECT IMPACTS AND RESPONSES

5.1 Introduction

This section identifies the most significant positive and negative impacts that may result from the project. Many of these impacts will be addressed through mitigation. Accordingly, this section describes the measures and processes that are proposed both to enhance the benefits and to limit the adverse impacts associated with the project. This in turn leads to a description of the residual impacts, that is, the net positive and negative impacts remaining after all practical mitigative measures have been implemented.

Impacts are presented as follows:

- impacts on the natural environment (biological and physical impacts); and
- impacts on the human environment (socio-economic impacts).

Impacts occurring in Central Labrador are related predominantly to operations and activities taking place at CFB Goose Bay. Impacts in the training areas are associated with the noise and disturbance resulting from overflights by military aircraft.

The first part of this section describes the future distribution of aircraft sorties under the project maximum of 18,000 sorties per year. Mitigation measures that are planned or currently in place are described next. This is followed by a description of predicted impacts.

5.2 Distribution of Overflights

Figure 8 presents the distribution of the 18,000 sorties that will be flown under the project maximum. These sorties will take place over a nine-month training season (March-November inclusively) and will be distributed over a 100,000 square kilometer training area. It is highly unlikely that more than 300 sorties will take place on any given day. Because training activities are spread out over time and distributed throughout a large area, the frequency with which any area within the training areas will be overflown is quite low. In fact, as indicated on Figure 8, the vast majority of the training areas will be overflown, on average, less than once per day. This includes all overflights within one (1) kilometer of any given location (e.g. cabin, campsite, etc.) at all altitudes. The likelihood of a direct overflight at 100 feet altitude is much lower.

5.3 Mitigation Options

Project impacts to a large degree depend on the location of the flight training areas and the distribution of flight activities. The present flight training areas are described in Section 2 of this Summary.

The present training areas were developed in the 1980s based primarily on operational needs. Continuation of the current avoidance program within these areas is threatening the viability of the program and cannot be maintained within the existing training areas. In order to maintain current avoidance standards and the resulting level of protection of the environment, the training areas could be reconfigured to permanently remove areas of importance to wildlife and resource users.

The following sections assess impacts associated with the continuation of the existing training areas: Mitigation Option A and Mitigation Option B (reconfiguration). These options are described in Section 5.5.

5.4 Impacts

5.4.1 Impacts on the Natural Environment

This section describes the predicted impacts on valued ecosystem components (VECs) and on ecosystem processes. Without mitigation, major impacts are predicted for the George River caribou herd, several raptor species and harlequin ducks (Table 7). These impacts result from all project activities, although noise is the principal impact source in all cases. These impacts are reduced or eliminated depending upon the mitigation option considered (Option A or Option B, described in Section 5.5 below).

5.4.1.1 Effect of Noise on Wildlife

Impacts of noise on wildlife populations can be both direct and indirect. Although the consequences of noise are not totally understood, the best known effect is the so-called escape or startle reaction.

Figure 8 - Distribution of Sorties (all altitudes) Future Situation

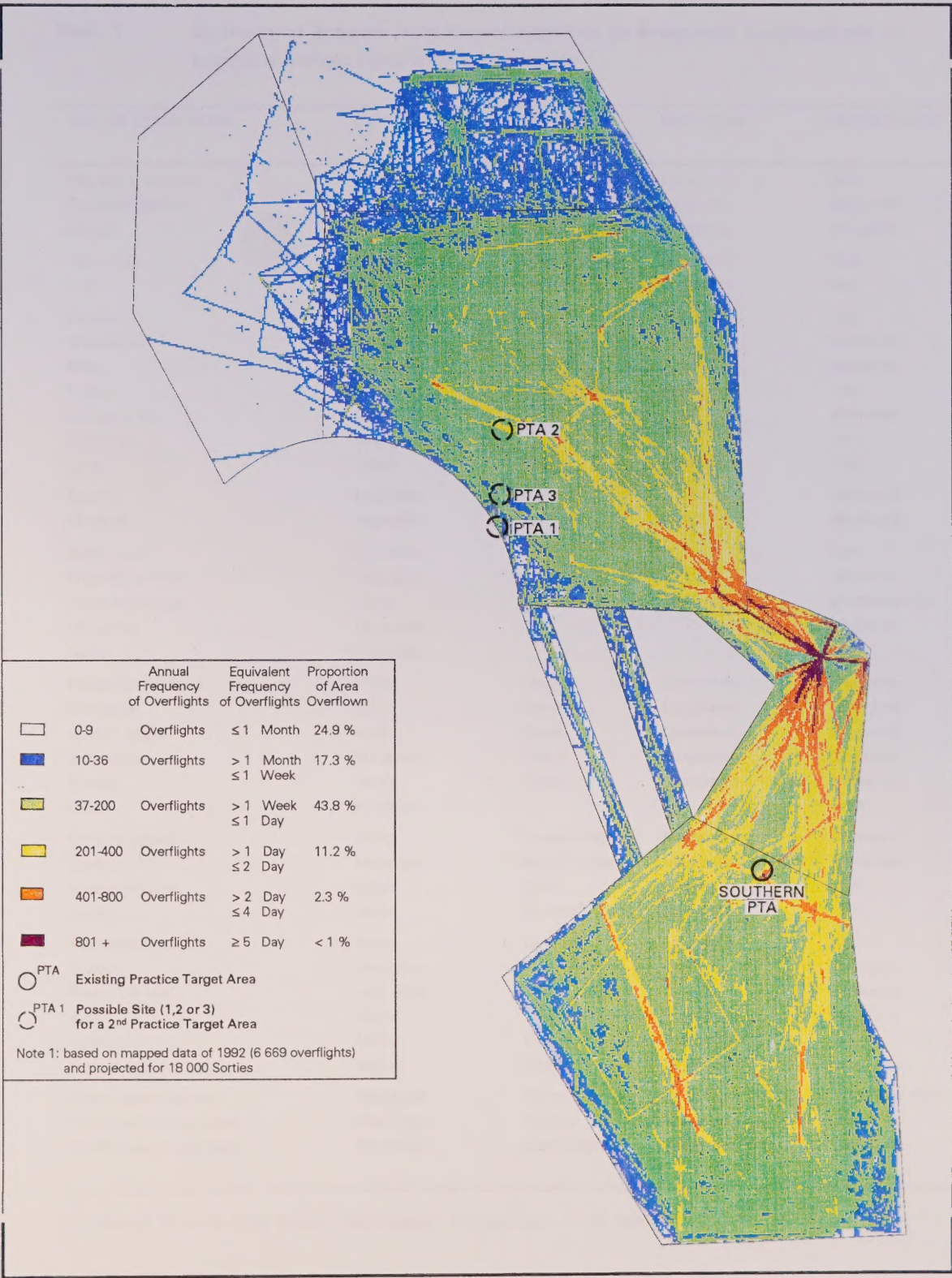


Table 7 **Summary of Impacts of All Project Activities on Ecosystem Processes and on Individual Valued Ecosystem Components**

VEC OR ECOSYSTEM	IMPACT RATING	TYPE OF EFFECT	DURATION	UNCERTAINTY
Migratory caribou	Major	Direct	Long-term	Low
Resident caribou	Major	Direct	Long-term	Moderate
Moose	Minor	Direct	Moderate	Moderate
Black bear	Minor	Direct/Indirect	Long-term	High
Wolf	Major	Indirect	Long-term	High
Marten	Minor-Moderate	Direct	Moderate	High
Wolverine	Negligible	-	-	Moderate
Mink	Negligible	-	-	Moderate
Otter	Minor	Direct/Indirect	Moderate	High
Coloured fox	Negligible	-	-	Moderate
Arctic fox	Negligible	-	-	Low
Lynx	Minor	Direct	Moderate	High
Beaver	Negligible	-	-	Moderate
Muskrat	Negligible	-	-	Moderate
Arctic hare	Negligible	-	-	Low
Snowshoe hare	Negligible	-	-	Moderate
Small mammals	Minor	Direct/Indirect	Moderate	Moderate-High
Porcupine	Negligible	-	-	Moderate
Seals	Negligible	-	-	Low
Peregrine falcon	Major	Direct	Long-term	Moderate
Gyr falcon	Major	Direct	Long-term	Moderate
Golden eagle	Major	Direct	Long-term	Moderate
Bald eagle	Moderate	Direct	Long-term	Moderate
Osprey	Minor	Direct	Long-term	Moderate
Owls	Negligible	-	-	High
Canada goose	Minor	Direct/Indirect	Moderate	Moderate
Ducks	Moderate	Direct/Indirect	Moderate	Moderate
Harlequin duck	Major	Direct	Long-term	High
Loons	Minor	Indirect	Moderate	High
Ptarmigan	Minor	Direct	Moderate	High
Grouse	Negligible	-	-	Moderate
Passerine birds	Negligible	-	-	Moderate
Fish	Minor	Direct/Indirect	Long-term	Moderate
Vegetation	Minor	Direct	Moderate	Low
Lichens	Minor	Direct	Long-term	Low
River valley habitats	Moderate	Direct/Indirect	Long-term	Moderate-High
Terrestrial ecosystems	Moderate	Indirect	Long-term	High
Freshwater ecosystems	Moderate	Direct/Indirect	Moderate	Moderate

See Chapter 10 of the Main Report: "Methodology" for Definitions of the Ratings

Longer-term effects of exposure to noise, especially the effects of noise from low-level flying on how animals may use the land and on their reproductive cycle, are difficult to determine because too few studies have examined this topic. It is safe to assume, however, that the seriousness of any impacts due to noise relates directly to the intensity and duration of the noise and the sensitivity to noise of the species exposed to it. In light of these circumstances, DND has demonstrated its commitment to avoiding important and/or sensitive wildlife and resource use areas and remains committed to protection of the environment.

Two principal concerns were identified with respect to the effects of noise on wildlife: the first is that overflights would result in decreased use of land they have normally used; the second is that noise would affect behaviour to the extent that rates of productivity would be affected. In either case a decline in numbers could result.

5.4.1.2 Description of Impacts on Wildlife

a) Caribou

Two groups of caribou may be impacted by activities within the training areas: barren ground, or migratory caribou, and resident woodland caribou. The largest affected group is the barren ground George River herd, numbering up to 500,000 animals, some of which at times are found in the northern training areas. The Red Wine herd of resident woodland caribou can be found both in the southeastern part of the northern training area and in the transit corridors between there and Goose Bay.

Current training activities do not appear to have caused either long-term changes in habitat use or significant increases in energy expenditures in any of the caribou studied.

At the maximum level of activity for the project, severe disturbances to some groups of caribou from the George River herd could occur, particularly during the calving and post-calving periods. Because migratory caribou aggregate in large herds during certain times of the year (calving, insect-harassment and migratory periods), they may be particularly vulnerable to aircraft disturbance. The George River herd has used only one main calving area in recent years, and the concentration of most females in the same area increases the vulnerability of the herd at this time. There is concern that any disturbance could result in increased mortality of caribou calves and therefore a reduction in the productivity of the population. The potential impact at the maximum level of activity on the George River herd is therefore rated as major. Depending upon the mitigation option that is selected, the impact on the George River herd is expected to be reduced to moderate (Option A) or minor (Option B). The mitigative options are described in Section 5.5.

A large proportion of the resident caribou would be affected. In the absence of mitigation, repetitive disturbances are expected to increase. A major long-term impact is predicted for the Red Wine herd. However, other resident caribou are widely dispersed within their range, and hence each overflight is likely to disturb only a few individuals at any one time. A long-term impact on these resident caribou is expected

as a result of noise and other project activities. This impact remains moderate under mitigative Option A and is reduced to minor under Option B.

b) Moose

Although moose have only recently expanded their range into Central Labrador, they are to be found at low densities throughout the southern portions of the study area. Moose are expected to be most sensitive to disturbance when the animals are stressed by the severe environmental conditions of late winter (March-April).

Moose are relatively tolerant of aircraft noise and seldom display a strong "panic" response, even when approached at low altitudes. Since moose are not common in the low-level training areas, the number of animals affected is small. Current training activities have not had any measurable impact on moose. With the increase in flights anticipated with the maximization of the project, the impact on moose can be expected to increase. Nevertheless, because relatively little flight training takes place in March and April, and because of the relatively wide dispersion of moose in the training areas, the numbers potentially affected will be small and the overall impact is expected to be minor.

c) Large Carnivores

Black bears and wolves are found in the study area. Black bears and wolves are believed to be common throughout the study area. Both species are found at low densities whenever an adequate prey base is present. While neither species is sensitive to noise, both could suffer from any decline in their prey base. This indirect impact is expected to be minor for black bears and major for wolves. If a decline in the prey base does not occur, i.e. if mitigation Option B is selected, then no impact is expected.

d) Furbearers

In terms of economic importance, the marten, coloured fox, lynx and beaver are the most important furbearers in the study area. The marten and the lynx both inhabit the forested areas and both are thought to be numerous; the coloured fox is found throughout the study area. The beaver's habitat is in the inland waters; its population level is relatively constant. All are, and will be, exposed to noise disturbance from low-level training flights. Although the sensitivity of these species to aircraft noise and the possible effects of this disturbance on habitat occupancy and productivity are not fully known, current training activities have not had any measurable impact on these species. Consequently, the impact of the project maximum ranges from negligible to minor for all species except marten. Marten is subject to a minor-moderate impact. This impact cannot be reduced through mitigation.

e) Small mammals

Several species of small mammals (voles, lemmings, mice, shrews) are found throughout the study area. It is impossible to determine the frequency of overflights that will be received by small mammals because

their distribution within the study area is unknown. As a group they will potentially experience high frequencies of overflights only in areas that will be intensely overflown. Therefore, minor impacts are predicted for small mammals.

f) Birds of Prey (Raptors)

Sixteen species of raptors are found within the study area. Three of them (the peregrine falcon, the gyrfalcon and the golden eagle) have particular importance because of scarcity or sensitivity. Nesting cliffs of peregrine falcons, gyrfalcons and golden eagles are often concentrated on the rugged slopes of river valleys, which receive relatively high use by military aircraft. Forest-nesting raptors such as osprey and bald eagles are more widely dispersed in the project area than are cliff-nesting species. The distribution patterns of owls in the study area are poorly known, but nesting owls are likely to be widely dispersed.

The impact on peregrine falcons, gyrfalcons and golden eagles is predicted to be major due to their use of nesting sites at locations subjected to high frequency of overflights and their small population sizes. These impacts are reduced to moderate under mitigation Option A and negligible under Option B.

The predicted impacts on bald eagles (moderate), osprey (minor) and owls (negligible) result from their wider distribution in the training areas and their greater tolerance to disturbance.

g) Waterfowl

The region provides habitat for approximately 29 species of waterfowl and contributes significantly to the Atlantic Flyway waterfowl stocks. The periods of greatest vulnerability are during breeding, moulting and while the birds are at staging areas. There are important staging areas on the coast, but they will not be affected by the project. Other sensitive areas include Lake Melville, particularly during the spring migration, when it is an important black duck moulting area. The impact is predicted to be minor for Canada geese, moderate for ducks (as a group) and minor for loons. The impact on the harlequin ducks is major because the potential exposure of harlequin ducks to aircraft disturbance is high, the population is small, and nests are concentrated in river valleys, which generally receive heavy use by military aircraft.

The impact on harlequin ducks is reduced to moderate under mitigation Option A and minor under Option B.

5.4.1.3 Effects of Other Project Activities

a) Aircraft Exhaust

Most of the air pollutants found in Labrador and northern Quebec come from distant industrial and urban sources (Long-Range Transport of Air Pollutants, or LRTAP), mainly in southern Quebec, Ontario and from as far away as the American midwest. This situation will not change. An extreme worst-case analysis for ground level concentrations of air pollutants derived from aircraft exhaust systems in the transit corridors

demonstrated conclusively that there is and will be no air quality problems in these areas under current and future levels of flying activity; it follows, therefore, that there will be no air quality problems in the training areas, where the aircraft will be much more dispersed than in the transit corridors. No contamination was found on lichens, which are sensitive indicators of chemical pollution in the ecosystem, in areas subjected to intense military flying activity. In summary, the operation of military jet aircraft is unlikely to result in elevated concentrations of trace elements in the vegetation, and hence the contamination of food webs is highly unlikely.

The lakes and rivers of Labrador are known to have a low buffering capacity and are therefore sensitive to acidic precipitation. It is also recognized that acidification of northern lakes and rivers over the past 30 years is the result of the increased atmospheric deposition of sulphur oxides and, to a lesser degree, nitrogen oxides, but the sources of the deposition are not local. Increased flying activity will not result in significant increases in either sulphate or nitrate loadings. The impact of pollutants released in aircraft exhaust emissions on the freshwater ecosystems of the study area is predicted to be local and short-term and is thus rated as minor. On the basis of these conclusions and the clearly low ambient concentrations of air pollutants, it has been concluded that effects on all Valued Ecosystem Components will be negligible.

b) Fuel Dumping

Military aircraft may have to discharge fuel directly into the atmosphere as a precautionary measure during an in-flight emergency to reduce weight and to facilitate a safer landing. There are two procedures: the most frequently used is referred to as a fuel dump and involves the release of fuel in designated areas at altitudes between 3,000 and 5,000 feet to ensure that it vaporizes before reaching the ground; a rarer procedure involves the jettisoning of an entire external fuel tank, which is done only in extreme emergencies, most commonly immediately after take-off. When the tank impacts the land or water surface, it ruptures and can cause an acute, but localized, pollution event. The Base is committed to carrying out an immediate environmental clean-up of the fuel tank and the associated spill area.

At the maximum level of activity under the project, an estimated 30 fuel dumps and about 2 tank jettisons could occur each year. It is estimated that the fuel dumps will not have a detrimental effect on soils, vegetation or aquatic systems; the tank jettisons could have acute, but localized, impacts on the land or water environment.

c) Weapons

Only inert (non-explosive) ordnance are used during military training from CFB Goose Bay. Live weapons are not used at present and will not be used in the future. All practice weapons are, and will be, confined to designated ranges called Practice Target Areas (PTAs). The Base carries out a clean-up of the range at the conclusion of each flying season under the scrutiny of the responsible provincial agency.

The number of PTAs will increase from one at the present time to two at the maximum projected levels of flying activity. The location of the proposed PTA has not been finalized. Three candidate locations are

presented on Figure 1. The overall impact of routine weapons training and accidents in the PTAs is negligible in view of the small area occupied by each PTA. The existing PTA occupies approximately 175 km² and the proposed PTA is to occupy about 300 km².

d) Aircraft Accidents

Two categories of aircraft accident are considered: the consequences of an impact between an aircraft and a bird, and the consequences to the environment of an aircraft crash.

Bird strikes pose a serious risk to both pilots and aircraft, and concentrations of birds are routinely avoided. It is difficult, therefore, to predict strike frequency. Except for those populations which may be rare or endangered, such as peregrine falcons, the impact on the birds is negligible at the population level. With respect to endangered species, even a single mortality would be cause for concern. The likelihood of such an event is low, due to the small number of bird strikes that occur each year (about 10) and the small number of rare or endangered birds present in the training areas.

The risk of aircraft crashes is low. The environmental concerns associated with a crash, should it occur, include the risk of starting a forest or tundra fire and the risk of releasing fuel or hydrazine into the freshwater or marine environment. In Labrador, only one minor forest fire can be attributed to a crash by a military aircraft in the past 25 years. Experience suggests that aircraft crashes present very low forest fire hazard compared with naturally occurring wildfires. The effects of fuel or hydrazine releases into water would be localized, and the impacts are therefore rated as minor. The overall impact of aircraft crashes on vegetation is expected to be minor.

e) Construction and Operation of Facilities

Construction of a new PTA and camera targets in the training areas, which would involve helicopters and heavy equipment, could disturb wildlife and alter their habitat at and around new facilities. The construction of additional facilities at CFB Goose Bay would also involve sewage and solid waste disposal, and the use and disposal of hazardous substances such as oils, lubricants and fuels. In the vicinity of the airport, the effects on vegetation and soil, due to accidental fuel spills, are predicted to be minor, and localized. The Base is committed to the clean-up of any such accidental spills in accordance with approved environmental standards. A reduction in the abundance of small mammals in the area around the airport may also occur due to stress-related mortality. The construction of additional facilities in the LLTAs is not expected to have any significant impact on VECs.

The project will result in a small increase in both the military and civilian resident population. This will result in slightly higher levels of recreational fishing and hunting, placing pressure on animal populations.

This is expected to have a negligible to minor impact on the local abundance of wildlife.

5.4.2 Impacts on the Human Environment

The social and economic impacts of this project will be felt in various ways across the study area. At a broad level there are two categories of effects:

- those related to the operation of the Base at Goose Bay, most of which will be localized and felt in the communities of the area, namely in Happy Valley - Goose Bay, Mud Lake, North West River and Sheshatshit; and
- those related to military flying over Labrador and Quebec, which will be felt by the users of the land and water areas presently overflowed, or that could be overflowed in the future.

5.4.2.1 Economic and Commercial Impacts

The Canadian Forces Base at Goose Bay is the most important element in the economy of Central Labrador. The project itself will have a limited requirement for additional civilian employees, adding about 80 persons to the civilian staff and 30 to the military staff. However, the project will ensure the maintenance of current employment at the Base (over 1,500 jobs).

Direct employment includes the requirements for labour during construction and for permanent personnel during operation. Indirect employment opportunities will also be created in town, and local business will benefit by military purchasing of goods and services.

Table 8 illustrates the expenditures that are associated with the project. Total expenditures are expected to increase by 33% or by \$42.23 million. These expenditures will generate local employment. Catering, for example, is expected to increase by 118% or by \$2.6 million, which is a significant sector of the local economy.

Table 8 Summary of Project-related Economic Impacts

	DIRECT & INDIRECT	INDUCED	TOTAL
1992			
Employment (Person-Years)	1,984	304	2,288
Income Account Summary (\$)	60,090,000	15,040,000	75,130,000
Government Revenues (\$)	18,130,000	6,500,000	24,630,000
Projected			
Employment (PYs)	2,111	322	2,433
Income Account Summary (\$)	66,110,000	15,940,000	82,050,000
Government Revenues (\$)	22,650,000	7,210,000	29,860,000
Increase			
Employment (PYs)	127	18	145
Income Account Summary (\$)	6,020,000	900,000	6,920,000
Government Revenues (\$)	4,520,000	710,000	5,230,000

Source: Gardner Pinfold Consulting Economists Ltd.

The economic impact of the project in Central Labrador is already substantial. The impact associated with the projected increase in the number of sorties will be modest. Regionally, in Central Labrador, there will be benefits in the form of some additional jobs and the increased expenditures of Allied service personnel. The increase in the number of sorties will not have a disruptive economic impact on Happy Valley - Goose Bay. What may be important is the rate at which the additional sorties occur. If the build-up to 18,000 is rapid, the resulting economic impact would likely be that of short-term boom. If the build-up took place over a more prolonged period, the economic impact would be indistinguishable from normal growth.

5.4.2.2 Impacts on Resource Use

The project will have impacts upon various types of actual and potential resource use in the study area; community resource use and wilderness tourism are particularly relevant. This section also discusses the interface between the project and existing or proposed industrial activities.

a) Community-Based Resource Use

Residents in all the communities of the study area harvest a variety of fish, wildlife, wood and berries for social and cultural as well as economic reasons. Harvesting is particularly important to the aboriginal communities, where it is integral to their culture and way of life and provides an important part of their subsistence requirements. Harvesting in some instances also forms an essential supplement to other sources of income. It is not surprising, therefore, that the potential effects of the proposed developments on the area's natural resources are of concern to the users of the land, a concern that was voiced throughout the field consultations. Concerns centred around potential changes to the distribution and abundance of wildlife caused by project activities.

Table 9 depicts the importance of the harvesting activities undertaken within the study area to specific communities; it does not, however, indicate the full importance of harvesting to a community where that harvesting is undertaken outside the study area boundaries. For example, the northern Quebec communities of Kuujjuaq and Kangiqsualujjuaq both depend in large measure on harvesting, but the harvesting does not extend southward into the study area. Table 9 indicates quite clearly the importance of harvesting within the study area to communities of Central and North Labrador, particularly fishing and caribou hunting. In addition, trapping in the southern portion of the study area is important to several communities along the Quebec North Shore.

Given the duration of the existing flying season there is only minimum overlap between the timing of community-based resource use activities and low-level flights. For example, although trappers harvest in parts of the southern training area, trapping generally takes place in winter, when there are no military flights, or during low season of training in the early spring and late fall.

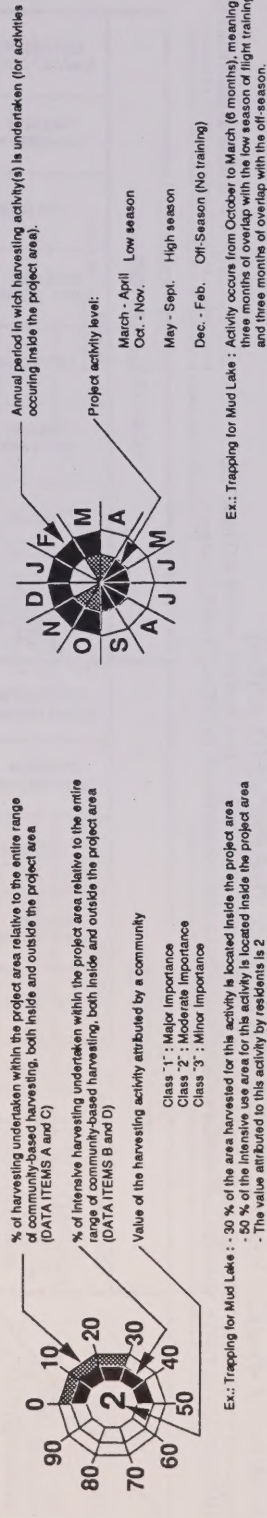
COMMUNITY-BASED HARVESTING DATA (WITHIN THE PROJECT AREA)

PRESENTED BY SPATIAL PERCENTAGE OF PROJECT AREA HARVESTING RELATIVE TO THE WHOLE, VALUE ATTRIBUTED TO HARVESTING ACTIVITY, TEMPORAL PERIOD FOR HARVESTING ACTIVITIES PURSUED IN PROJECT AREA (07-02-94)

Table 9

PARAMETER REGION COMMUNITY	SPATIAL ANALYSIS							TEMPORAL ANALYSIS								
	ALL ACTIVITIES INSIDE PROJECT AREA	FISHING	BIG GAME HUNTING	TRAPPING	SMALL GAME HUNTING	SEALING	WATERFOWL HUNTING	WOOD / BERRY GATHERING	PERIOD OF ALL ACTIVITIES INSIDE PROJECT AREA	FISHING	BIG GAME HUNTING	TRAPPING	SMALL GAME HUNTING	SEALING	WATERFOWL HUNTING	WOOD / BERRY GATHERING
CENTRAL LABRADOR																
• Happy Valley Goose Bay			N/A			N/A					N/A			N/A		
• North West River			N/A			N/A					N/A					
• Mud Lake			N/A			N/A					N/A					
NORTH LABRADOR																
• Nain			N/A	N/A	N/A	N/A	N/A	N/A			N/A	N/A		N/A	N/A	N/A
• Hopetale		N/A	N/A			N/A	N/A	N/A		N/A	N/A			N/A	N/A	N/A
• Postville		N/A	N/A			N/A	N/A	N/A		N/A	N/A			N/A	N/A	N/A
• Makkovik		N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A
• Rigolet	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

LEGEND



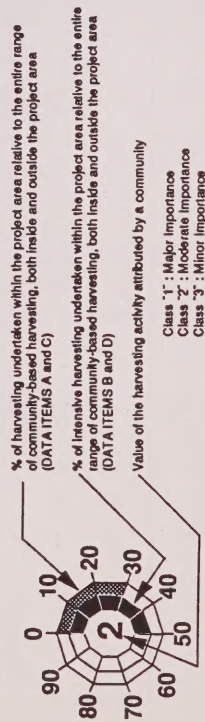
COMMUNITY-BASED HARVESTING DATA (WITHIN THE PROJECT AREA)

PRESENTED BY SPATIAL PERCENTAGE OF PROJECT AREA HARVESTING RELATIVE TO THE WHOLE, VALUE ATTRIBUTED TO HARVESTING ACTIVITY, TEMPORAL PERIOD FOR HARVESTING ACTIVITIES PURSUED IN PROJECT AREA (07-02-94)

Table 9 (continued)

PARAMETER	SPATIAL ANALYSIS							TEMPORAL ANALYSIS								
	ALL ACTIVITIES INSIDE PROJECT AREA	FISHING	BIG GAME HUNTING	TRAPPING	SMALL GAME HUNTING	SEALING	WATERFOWL HUNTING	WOOD / BERRY GATHERING	PERIOD OF ALL ACTIVITIES INSIDE PROJECT AREA	FISHING	BIG GAME HUNTING	TRAPPING	SMALL GAME HUNTING	SEALING	WATERFOWL HUNTING	WOOD / BERRY GATHERING
SOUTH LABRADOR • Cartwright • Paradise River • Port Hope Simpson • Charlottetown • Strait of Belle Isle	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WEST LABRADOR • Labrador City / Wabush	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
• Churchill Falls			N/A			N/A		N/A			N/A			N/A		N/A
QUEBEC BORDER • Farnham • Schefferville	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
• Kawawachikamach			N/A			N/A	N/A	N/A			N/A			N/A	N/A	N/A
QUEBEC NORTH SHORE • Sheldrake / Rivière- au-Tonnerre • Longue Pointe de Mingan / Rivière St-Jean / Magpie	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

LEGEND



SPATIAL ANALYSIS

% of harvesting undertaken within the project area relative to the entire range of community-based harvesting, both inside and outside the project area (DATA ITEMS A and C)
% of intensive harvesting undertaken within the project area relative to the entire range of community-based harvesting, both inside and outside the project area (DATA ITEMS B and D)
Value of the harvesting activity attributed by a community

Class "1" : Major Importance
Class "2" : Moderate Importance
Class "3" : Minor Importance

TEMPORAL ANALYSIS

Annual period in which harvesting activity(s) is undertaken (for activities occurring inside the project area).



Ex.: Trapping for Mud Lake : Activity occurs from October to March (6 months), meaning three months of overlap with the low season of light training and three months of overlap with the off-season.

COMMUNITY -BASED HARVESTING DATA (WITHIN THE PROJECT AREA)

PRESENTED BY SPATIAL PERCENTAGE OF PROJECT AREA HARVESTING RELATIVE TO THE WHOLE, VALUE ATTRIBUTED TO HARVESTING ACTIVITY, TEMPORAL PERIOD FOR HARVESTING ACTIVITIES PURSUED IN PROJECT AREA (07-02-94)

Table 9 (continued)

PARAMETER	SPATIAL ANALYSIS								TEMPORAL ANALYSIS								
	ALL ACTIVITIES INSIDE PROJECT AREA	FISHING	BIG GAME HUNTING	TRAPPING	SMALL GAME HUNTING	SEALING	WATERFOWL HUNTING	WOOD / BERRY GATHERING	PERIOD OF ALL ACTIVITIES INSIDE PROJECT AREA	FISHING	BIG GAME HUNTING	TRAPPING	SMALL GAME HUNTING	SEALING	WATERFOWL HUNTING	WOOD / BERRY GATHERING	
QUEBEC NORTH SHORE • Natashquan / Aguanish • La Romaine • Baie des Moutons / La Tabatière					N/A	N/A	N/A	N/A						N/A	N/A	N/A	
						N/A	N/A	N/A	N/A						N/A	N/A	N/A
						N/A	N/A	N/A	N/A						N/A	N/A	N/A
• Saint-Augustin • Vieux Fort / Rivière Saint-Paul • Blanc Sablon / Brador	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
NORTHERN QUEBEC • Kuujuaq • Kangisuaqjuag	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

LEGEND

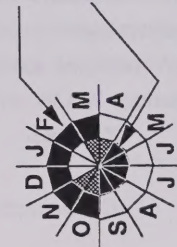
SPATIAL ANALYSIS
% of harvesting undertaken within the project area relative to the entire range of community-based harvesting, both inside and outside the project area (DATA ITEMS A and C)

% of intensive harvesting undertaken within the project area relative to the entire range of community-based harvesting, both inside and outside the project area (DATA ITEMS B and D)

Value of the harvesting activity attributed by a community

Class "1": Major Importance
Class "2": Moderate Importance
Class "3": Minor Importance

Ex.: Trapping for Mud Lake : - 30 % of the area harvested for this activity is located inside the project area
- 50 % of the intensive use area for this activity is located inside the project area
- The value attributed to this activity by residents is 2



TEMPORAL ANALYSIS

Annual period in which harvesting activity(s) is undertaken (for activities occurring inside the project area).

Project activity level:

March - April Low season
Oct. - Nov. High season
May - Sept. Off-Season (No training)
Dec. - Feb.

Ex.: Trapping for Mud Lake : Activity occurs from October to March (6 months), meaning three months of overlap with the low season of flight training and three months of overlap with the off-season.

From June to September, fishing occurs inside the northern training area by harvesters from Churchill Falls, Nain and all the communities of Central Labrador; the activity also is significant to the Naskapi of Kawawachikamach. Fishermen from several communities along the Quebec North Shore fish in areas along the southern and eastern edges of the southern training area. A greater potential conflict is created by the use of two areas near the centre of the southern training area by individuals from Natashquan, Aguanish and La Romaine, where fishing and trapping is ranked as being of major importance to these communities.

The flying season will cover up to 36 weeks under the project. Caribou hunters could be in the northern training area in both the spring and the fall. There would be little fishing pursued anywhere in October or November, but fishermen from several communities of the Quebec North Shore would fish in the southern training area in March. During October and November, the flying season could also impinge on trapping in both the northern and southern training areas. This activity is ranked as being of major importance to several communities along the Quebec North Shore and to the Naskapi of Kawawachikamach.

b) Tourism

i) Consumptive Activities

The level of impact is determined by examining the level of disturbance experienced by the outfitter, and the impact of overflights on the species harvested.

The impact of the project on consumptive tourist activities will be the greatest in Central Labrador. This is the case because the outfitters operating out of Central Labrador receive the highest level of disturbance from overflights. This impact will be reduced to moderate under Option A and minor under Option B.

On the Quebec North Shore, however, most of the camps are overflown infrequently and the impact on the resource harvested (moose) is minor. Therefore the impact of the project on outfitting activities on the Quebec North Shore will be moderate. Impacts are reduced to minor under Option A and negligible under Option B.

In the Quebec Border region the impact of project activities will also be moderate. Although the camps are infrequently overflown, the species harvested in the area is caribou, upon which the impact of project activities is major. This impact is reduced to minor under Option A and negligible under Option B.

ii) Non-Consumptive Activities

In the project area, most non-consumptive tourist activities are organized out of Central Labrador: dogsledding and snowmobiling expeditions in the Lake Melville area, observation of the Mealy Mountain and Red Wine caribou herds, canoe trips along the Churchill River from Happy Valley - Goose Bay to Churchill Falls. Canoe trips are also organized along the George River in the Quebec Border Region and

on the St-Jean, Aguanus and Natashquan rivers on the Quebec North Shore. Caribou-watching trips are also organized in North and West Labrador.

Most winter activities occur from December to April and summer activities are practised from June to October. Therefore, the operating season for summer activities corresponds to the high season for military overflights.

Since most non-consumptive activities are organized during the summer, the potential for conflict between the military flight training season and the operating period is greatest.

Since the growth potential for non-consumptive tourist activities is high throughout the region, expansion will no doubt occur in the project area in the future. However, for the foreseeable future, development of adventure tourism and other forms of non-consumptive tourism activities are expected to be concentrated in northern Labrador and in coastal areas outside the training areas. In the long term an increase in military overflights could constrain the future development of this sector of the tourist industry throughout the project area.

c) Industrial Resource Use

The further development of both the renewable and non-renewable resources of the study area may provide opportunities for the diversification of the economic base of the study area and for the generation of new opportunities for wage employment. Currently the principal interaction between military activities and industrial activity is the occasional overflight of work, exploration or construction crews in the field. This is not considered to have any impact on these activities, nor on the likelihood of such developments taking place.

5.4.2.3 Interpretive Summary of Socio-Economic Impacts

The distribution of impacts is not spread equally across the four communities of Central Labrador. Happy Valley - Goose Bay, the largest of the four, is a town with a population of over 8,000. The residents and business people in Happy Valley - Goose Bay are expected to benefit from the increased employment and business opportunities presented by the project. In contrast, North West River, Mud Lake and Sheshatshit are small and have limited capacity to do so (Table 10).

All the communities in Central Labrador will continue to be affected to some degree by competition for renewable resources from military personnel and other people who have moved or will be moving into the area. Fishing and hunting are popular recreational pursuits, but any increased demand for wildlife, although minor, would be felt most by those who depend on such resources for subsistence, particularly the residents of the smaller communities, including Sheshatshit.

Table 10 Distribution of Socio-Economic Impacts (Central Labrador)

IMPACTS	GROUP CONCERNED	OBSERVATIONS
<u>POSITIVE</u>		
Economic Stability	The population at large in Central Labrador, i.e. Inuit, Innu, Métis, settlers and others, male and female, in Happy Valley - Goose Bay, North West River, Sheshatshit and Mud Lake.	The Base is the largest employer in Central Labrador. It has provided a degree of economic stability to Central Labrador far greater than that of any other region of the Quebec-Labrador peninsula. This is expected to continue for the foreseeable future with the renewal of the MMOU.
Employment	Those presently employed will have greater confidence in employment stability. Those qualified for the limited number of positions to be generated directly and indirectly by the project. It is possible that people, particularly from the coast, may be attracted to Happy Valley - Goose Bay in the false expectation of an employment boom.	CFB Goose Bay is an equal opportunity employer so positions are open to both sexes and to all people regardless of religion or ethnicity. Young people entering the marketplace for the first time will face stiff competition for available openings.
Maintenance and Enhancement of Services	The population at large in Central Labrador and all who rely on the educational, health and other services available in Happy Valley - Goose Bay.	The presence of the Base and the associated employment and population in the region, ensure that the current high level of services will be maintained in Central Labrador.
Business Opportunities	The industrial, commercial, retail and service sectors who provide goods and services to the Base and those employed by them.	The Base is the economic motor of the region.
<u>NEGATIVE</u>		
Increased Pressure on Hospital Facilities	Those who work at, or are patients in, the existing hospital facility.	DND provides primary health care to DND and Allied military personnel.
Additional Sewage Load	All residents of Happy Valley - Goose Bay and residents of Mud Lake.	DND is currently negotiating a cost-sharing agreement with the Province for construction of a new hospital.
Increased Pressure on Social Services	Those on social assistance including the elderly, the young and women.	DND is participating in a study on sewage treatment requirements. Negotiations have begun on a cost-sharing agreement for a sewage treatment plant.
Sexual Assault and Violence Against Women	Women, particularly low income women and those attracted to the security perceived to be associated with military personnel.	Increased pressure on social services in Central Labrador because of the declining economic circumstances in Labrador is indirectly associated with project enhancement.
Alcohol and Drug Abuse	Those individuals, male and female, who have a tendency towards alcohol/drug abuse including aboriginal peoples, and who may have access to lower cost alcohol on the Base.	Military personnel are rarely involved in violence against women. The project is not a contributor to alcohol, drug or solvent abuse.

Many of the outlying communities are characterized by their small size and relative isolation. All are adapting to new pressures, including that of population growth. The prospect of project jobs, therefore, is greeted with some interest. Without the provision of timely and appropriate training and employment policies sensitive to their needs, however, the inhabitants of the outlying communities would have little chance of successfully capturing or retaining project-related jobs. The harvesting of renewable resources remains central to the subsistence economy and way of life of most of these communities. It is therefore important to minimize the opportunities for conflict between military use and resource harvesting.

5.4.2.4 Impacts on Public Health and Safety

The impacts of the project on public health and safety are minor or negligible. They derive from two distinct facets of the project:

- those resulting from the operations and installations associated with the project; and
- those resulting from the presence of military personnel at CFB Goose Bay.

Those aspects of project operation that may pose increased risk or other negative impact include noise, exhaust emissions, microwaves, hydrazine incidents, weapons accidents and aircraft crashes. The probable impacted groups are the military, residents of Central Labrador, aboriginal groups, land users and the residents of the outlying communities. Impacts may also result from the presence of a predominantly male transient community at CFB Goose Bay.

a) Impacts of Operations

i) Noise

Increased noise is perhaps the most obvious result of increased levels of military flying activity. It is also an acknowledged concern of many individuals and interest groups, including aboriginal groups, that the potential effects of noise extend from general annoyance and stress to individual hearing loss, and because the impacts may affect all identified groups in one way or another, the topic has been the focus of considerable research as part of this EIS. The measure of sound intensity is the "equivalent sound level" or Leq. Any Leq of 70 decibels (dB) or less does not pose a threat to hearing loss, even where an individual is exposed to such sound levels throughout his or her lifetime.

There are areas near the Base, notably Spruce Park, where the predicted Leq that would result from the project would exceed 70 decibels. It could reach a Leq of 85 to 95 under the project. At present levels, the noise certainly causes sleep disturbance to some individuals, interferes with certain levels of normal communication and causes annoyance. As the noise exposures increase, the problems become more acute. However, the noise levels expected to result from the project, although annoying to some, cannot cause hearing loss or other physical health effects.

In the transit corridors and training areas noise levels in the most heavily overflowed areas are predicted to rise to Leq 69. It is possible that noise exposures could be higher by a few decibels in deep river valleys and very close to camera targets, but since the Leq 70 safety limit is based on lifetime exposure, there is virtually no risk of hearing damage to anyone using these areas. "Startle reactions" also contribute to annoyance, but have not been proven in and of themselves to cause any health-threatening stress.

ii) Aircraft Exhaust Emissions

The groups most likely to be exposed to aircraft exhaust emissions are the military, inhabitants of Happy Valley - Goose Bay and those who use the lands underlying the transit corridors and training areas. Under certain weather conditions pollutants may occasionally exceed federal air quality objectives in the immediate vicinity of the runway, but no adverse effect on human health is expected even in the worst-affected areas, and certainly not in the transit corridors or training areas.

iii) Microwaves

Microwave threat emitters, unless operated within their parameters, can pose some danger to people.

However, use of these emitters is confined to the PTAs, which are restricted areas specifically selected because of their isolation, poor quality of habitat and scarcity of wildlife. In establishing safety limits for preventing injury through overexposure, every conceivable factor that could contribute to a higher level of radiation was assumed to occur. Under such extreme conditions, safe distances from the base of a "threat emitter" will vary from 100 to 700 m. A detailed on-site observation and a detailed measurement system will be required to accurately establish exposures likely to occur during normal operations of ground-based systems. Observation of established occupational safety procedures, including limiting access to essential personnel, will keep the risk of accidental occupational injuries to a minimum.

iv) Hydrazine

Hydrazine is considered to be a hazardous substance that can have toxic effects on humans. Because its use is restricted to F-16 fighters and because it is handled only in areas restricted to military personnel, risk to groups other than the military is insignificant.

v) Aircraft Crashes

An analysis of potential aircraft accident rates is not a prediction of how many will occur, but an assessment of the degree of risk attached to certain operations. A risk between 1 and 2 aircraft lost for every 10,000 hours flying time is estimated for future low-level operations. Given the settlement pattern and the fact that accident risks are much higher in the training areas than in the airport traffic patterns and transit corridors, the risk to the civilian population in the study area is negligible.

a) Impacts resulting from the presence of military personnel

i) Sexually Transmitted Diseases

The potential impact sources are military personnel associated with the staffing and operation of the project who seek sexual encounters with local women. Although sexually transmitted diseases (STDs) are endemic throughout the Quebec-Labrador peninsula, the incidence of STDs among military personnel and their dependants is very low. Also, because of the mental and physical demands of their training, their health is closely monitored and they are not likely to be carriers of STDs. The impact of military personnel as a source of STDs is expected to be negligible.

ii) Sexual Assault and Violence

Concern has been expressed that an increase in the number of military personnel could lead to increased violence against women in the communities of Central Labrador. However, recent studies reveal that over 90% of the violence against women in Central Labrador is perpetrated by civilian, not military males. Therefore, the project is expected to have a low impact with respect to violence against women in Central Labrador.

iii) Alcohol and Drug Abuse

The military presence and the availability of inexpensive liquor on Base may contribute to abuse by the local civilian population. Problems may result from the project personnel, military and civilian, and civilians living in Central Labrador interacting in the military bars and clubs at CFB Goose Bay. The abuse of alcohol, drugs and other substances is a problem common to communities throughout Central Labrador. The impact of the project's contribution to alcohol abuse is judged to be low.

iv) Prostitution

There is concern that the presence of the Base and associated transient military personnel will encourage prostitution among young women in Central Labrador. However, there is no evidence that organized prostitution exists in Central Labrador. Accordingly the project's contribution to prostitution in Central Labrador is judged to be negligible.

5.5 Mitigation/Enhancement

5.5.1 Mitigation/Enhancement Framework

A comprehensive framework is currently in place for the management and mitigation of the potential biophysical and socio-economic impacts of the project. This framework will be maintained and expanded as appropriate.

As the Minister responsible for DND, the Minister of National Defence has the ultimate authority and responsibility for the development of the project (Figure 9). The Base Commander is directly responsible for all military activities at CFB Goose Bay. All flying activities are coordinated by the Military Coordination Centre (MCC).

To assist in the implementation of the mitigation program, DND established and filled the following positions at the Base:

- Mitigation Coordination Officer (MITCO);
- Base Environmental Officer (BEnvO);
- Biophysical Effects Coordination Officer (BECO);
- Community Liaison Officer (CLO);
- Native Liaison Office (NLO); and
- Social Worker.

These positions will be maintained for the duration of the project.

The Mitigation Coordination Officer (MITCO) supervises the BECO, NLO and CLO positions and coordinates the mitigation program activities at the Base level. The Base Environmental Officer is chiefly responsible for the environmental considerations involved in the management of Base infrastructure. The BECO coordinates the wildlife avoidance monitoring program by ensuring that established criteria for avoidance of sensitive wildlife are followed. The Native Liaison Officer and the Community Liaison Officer establish contacts in communities throughout the peninsula so as to determine where and when the lands within the LLTAs are used by communities, tourists and other interests. These liaison positions were also created to encourage community groups and individuals to communicate their concerns to the Base. Specifically, the position of Native Liaison Officer was created to improve relations between the Base and aboriginal groups. DND has also created the position of Social Work Officer to provide counselling and social services to DND and Allied personnel and their dependants.

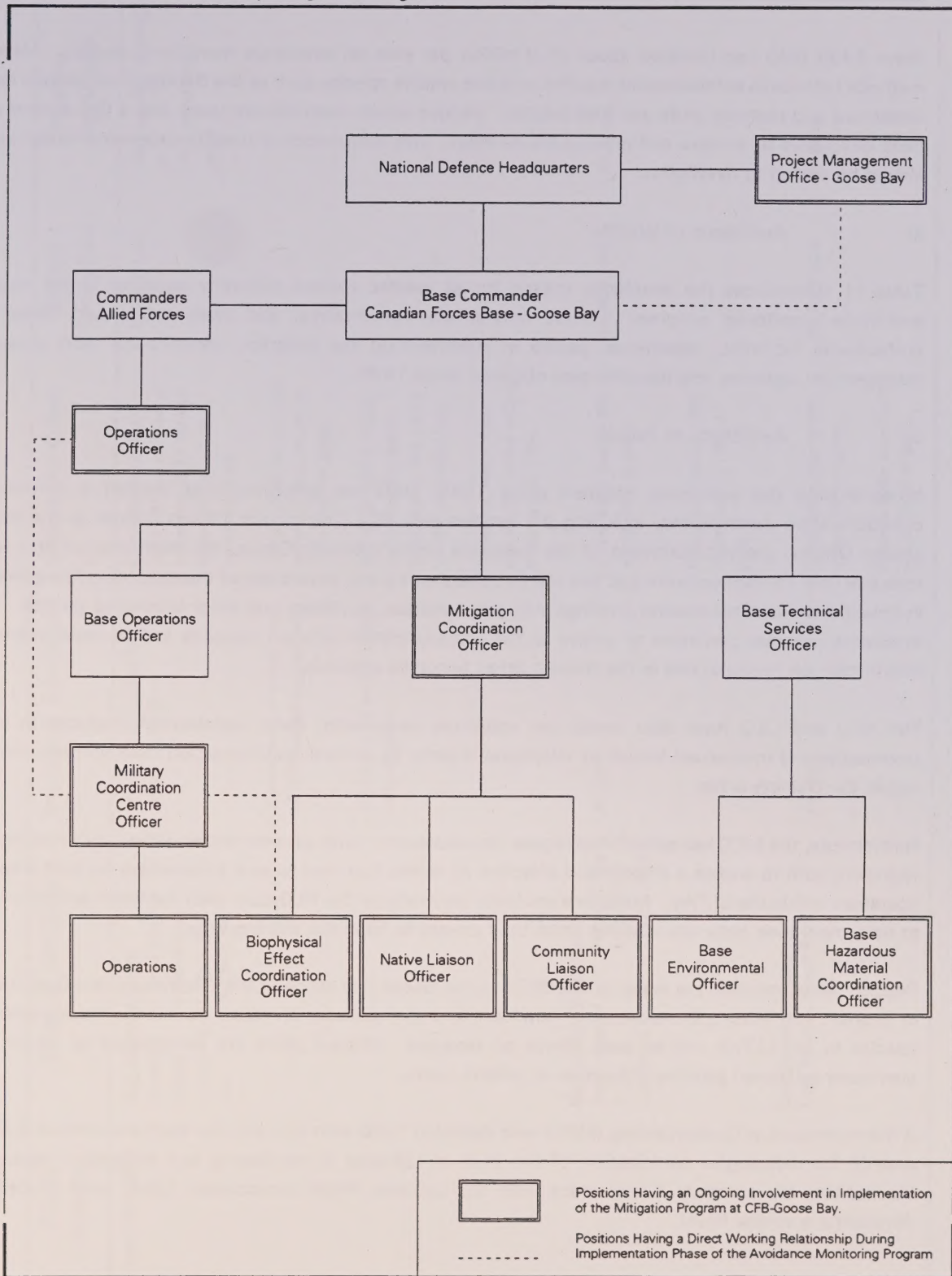
5.5.2 Avoidance as the Primary Mitigation Measure

Current Avoidance Practice

"Avoidance" is a form of mitigation that consists of eliminating the linkage between a project activity and an environmental component by separating the two in space or in time. Avoidance is considered to be a very prudent type of mitigation since it does not require that the effects of the interaction (linkage) between the project and the environment be quantified.

Figure 9 - Military Organizational Structure Simplified for Relevance to the Goose Bay Mitigation Program

SUMMARY



Since 1990 DND has invested about \$1.2 million per year on avoidance monitoring studies. Various methods have been established to monitor sensitive wildlife species such as the George River caribou herd, waterfowl and raptorial birds and their habitat. Various survey methods are used, and a GIS system has been developed to analyze and process information. This information is used to determine which areas should be closed to overflights.

a) Avoidance of Wildlife

Table 11 summarizes the avoidance criteria for all wildlife species presently included in the wildlife avoidance monitoring program. These criteria are conservative, and were established based on professional expertise, experience gained in implementing the program, consultation with resource management agencies and baseline data obtained since 1990.

b) Avoidance of People

In developing the avoidance program since 1989, DND has employed and created a number of communication mechanisms, including the appointment of a Community Liaison Officer and a Native Liaison Officer, the establishment of the Resource Users Advisory Group, the maintenance of a local resource user contact network and two toll-free telephone lines, advertising of the upcoming flying season in newspapers and pre-season briefings with air operators, outfitters and other interested parties. The avoidance program continues to evolve as the communication network expands and as more definitive information on resource use in the training areas becomes available.

The NLO and CLO have also conducted extensive community visits, established contacts in each community and maintained liaison by telephone in order to develop an information base on resource use within the training areas.

Furthermore, the MCC has established regular communication with all commercial airlines and local charter operators both to ensure a smooth and effective air traffic flow and to seek information on their areas of operation within the LLTAs. Additional contacts are made by the NLO/CLO with outfitters and operators to determine their activities and the times they expect to be in the training area.

Regular telephone calls are made by the BECO to the Goose Bay office of the Wildlife Division Department of Tourism and Culture, Government of Newfoundland and Labrador to update the information on sensitive species in the LLTAs and to seek advice on closures. Military pilots are encouraged to report any previously unknown sighting of wildlife or wildlife users.

A Memorandum of Understanding (MOU) was signed in 1990 with the Labrador Inuit Association (LIA) to provide for meaningful participation of the Inuit of Labrador in monitoring and mitigation measures. Discussions are currently taking place with the Labrador Métis Association (LMA) with a view to developing a similar MOU.

Table 11 Summary of Wildlife Avoidance Criteria

Wildlife Resource	Seasonal Sensitivity	Occupancy Sub-Criteria	Closure Sub-Criteria	Altitude Restrictions	Opening Sub-Criteria
George River Herd	<u>High Sensitivity Periods</u> Pre-calving 1 May-5 June Calving 6 June-30 June Post-calving 1 July-10 Aug Rut 16 Oct-15 Nov	- Density of ≥ 5 caribou/km ² within a grid cell, or - Visual sighting of a single group of ≥ 500 animals (aggregation), or - Presence of ≥ 1 satellite or VHF collared caribou	- Closure of occupied grid cell(s) (484 km ² each) and of a maximum of 8 x 484 km ² buffer grids around the occupied grid cell - Circular avoidance zone with radius of 36 km, centred on collar or group, <u>except</u>	- $\geq 2,000$ ft AGL	- Until new data obtained, or - Until end of critical period
	<u>Moderate Sensitivity Periods</u> August dispersal 11 Aug-30 Aug Pre-rut 1 Sept-15 Oct Late Winter 1 Mar-30 April	- As above	- Reduce buffer zone by 25% around collar or group - Reduce buffer zone by 50% around outlying collar or group	- $\geq 1,000$ ft AGL	- As above
	<u>Low Sensitivity Periods</u> Early Winter 16 Nov-28 Feb	- As above	- Reduce buffer zone by 50% around collar or group - Eliminate buffer zone around outlying collar or group	- $\geq 1,000$ ft AGL	- As above

Table 11 Summary of Wildlife Avoidance Criteria (Cont'd)

Wildlife Resource	Seasonal Sensitivity		Occupancy Sub-Criteria	Closure Sub-Criteria	Altitude Restrictions	Opening Sub-Criteria
Red Wine Herd	Calving	1 June-30 June	- Density of ≥ 5 female caribou/100 km ²	- Circular avoidance zone, with radius of 5 NM centred on the area containing the collar, group or density	- $\geq 1,000$ ft AGL	- Until new data obtained, or - Until end of critical period
			- Presence of ≥ 2 VHF or satellite signals with 5 NM x 5 NM area			
	Post-calving Rut	1 July-10 Aug 1 Oct-1 Nov	- Visual sighting of a group ≥ 10 caribou	- As above	- As above	- As above
	Calving (cont'd)		- Presence of ≥ 2 VHF or satellite signals within 5 NM x 5 NM area			
			- Visual sighting of a group of ≥ 10 caribou	- As above	- As above	- As above
Other Resident Caribou	Late Winter	1 Mar-31 May	- Presence of ≥ 2 VHF or satellite signals within 5 NM x 5 NM area			
			- Visual sighting of a group of ≥ 25 caribou within designated winter range	- Close designated winter range ¹	- As above	- As above
			- Presence of ≥ 2 VHF or satellite signals within designated winter range			
	Anytime		- Visual sighting of a group of ≥ 10 caribou	- Circular avoidance zone with radius of 3 NM, centred on group sighted	- $\geq 1,000$ ft AGL	- Until new data obtained
Moose	Late Winter	1 Mar-15 May	- Visual sighting of ≥ 0.5 moose/km ² over a minimum area of 10 km ² of habitat	- Closure of 1 km buffer zone around sighted concentration	- ≥ 500 ft AGL	- Until new data obtained, or - Until end of critical period

Table 11 Summary of Wildlife Avoidance Criteria (Cont'd)

Wildlife Resource	Seasonal Sensitivity	Occupancy Sub-Criteria	Closure Sub-Criteria	Altitude Restrictions	Opening Sub-Criteria
Raptors - Gyrfalcon - Golden Eagle - Peregrine Falcon	- Breeding period 1 Apr-31 July	- Active nest site or territorial pair present	- Circular avoidance zone with radius of 2.5 NM around nest or pair sighting	- $\geq 1,000$ ft AGL	- Until new data obtained, or - Until end of critical period
	- Breeding period 1 May-31 Aug				
	As above	- Confirmed active nest site	- Circular avoidance zone with radius of 1 NM around nest site	- As above	- As above
	As above	- Designated concentration of active nest sites (currently only two)	- Closure of designated concentration areas	- As above	- As above
- Osprey concentration sites					
- Osprey isolated nests	As above	- Active nest site outside of concentration areas	- Circular avoidance zone with radius of 2.5 NM around nest site	- As above	- As above
Waterfowl - General	Breeding period 15 May-25 Aug	- ≥ 4 birds/km ² in areas ≥ 25 km ² - ≥ 3 birds/km ² in areas 25-100 km ² - ≥ 2.3 birds/km ² in areas > 100 km ²	- Closure of high density area	- ≥ 700 ft AGL	- Until new data obtained, or - Until end of critical period
	Staging periods 15 Apr-31 May 25 Aug-21 Oct	- ≥ 100 birds/km ² , or - Visual sighting of a group of ≥ 500 birds	- Closure of a buffer zone of 2.5 NM surrounding the habitat	- $\geq 1,000$ ft AGL	- As above
	Moulting period 1 July-21 Aug	- Visual sighting of a group of ≥ 50 black ducks	- Closure of buffer zone with 1 NM radius centred on sighted group	- As above	- As above

Table 11 Summary of Wildlife Avoidance Criteria (Cont'd)

Wildlife Resource	Seasonal Sensitivity	Occupancy Sub-Criteria	Closure Sub-Criteria	Altitude Restrictions	Opening Sub-Criteria
- Harlequin duck Category I	Breeding period 15 May-31 Aug (south of 55°N) 31 May-31 Aug (north of 55°N)	- <u>Category I</u> : repetitive (≥ 2) sightings of harlequins in the same or subsequent years (i.e. occupancy verified)	- Avoid area 1,000 ft to either side of sighting and 0.5 NM upstream and downstream of sighting	- $\geq 1,000$ ft AGL along river valley - ≥ 500 ft AGL across river valley	- As above
- Harlequin duck Category II	As above	- <u>Category II</u> : single sighting of harlequins in an area (i.e. occupancy not verified)	- As above	- ≥ 500 ft AGL along or access river valley	- As above

¹ Designated late winter range refers to northeastern half of Red Wine Mountains, which receives concentrated use by caribou during the late Winter period (Brown 1986).

The current avoidance criterion for people consists of avoiding low-level (i.e. below 1,000 feet) overflights of occupied camps or sites within a radius of 2.5 nautical miles. Avoidance is practised throughout the known period of occupancy of the camp or site, as determined from the above sources.

c) Operational Difficulties

The avoidance program has had a growing impact on the flying program. Although the Allies have thus far been able to complete their annual flying program, it has been limited by Ministerial direction. In addition, more restrictions have been introduced each year as a result of the extensive wildlife studies undertaken by DND; the impact of the avoidance program on flight training has increased accordingly.

Despite their operational concerns, the Allies have been diligent in respecting the restrictions imposed by the avoidance program.

Table 12 details the number of square kilometres of LLTAs closed due to environmental restrictions in 1992. One day each week of the flying season was selected and the closures on that day were logged. A monthly average was calculated. The day that best represented this average was selected and plotted. The maps were distributed to Canadian fighter pilots who determined those additional areas rendered unusable or inaccessible (effective closures due to access problems) and the area was calculated. This number was added to the monthly average and a percentage of closure was obtained. The areas closed ranged from 6.1% of the LLTAs in April 1992 to 38.3% in October 1992. The major closures resulted from avoidance of George River caribou herd.

Maintaining the current standard of avoidance in the existing LLTAs has created operational problems for Allied flight training programs, problems that would be exacerbated with an increase in the number of flights. These problems have resulted from reductions in airspace available for training owing to wildlife and resource user avoidance closures. In addition, concentrations of low-level flights within narrow corridors or small spaces resulting from these closures cause potential flight safety hazards.

There is a consensus by all military participants that, under the current avoidance program, the project has reached a point where the operational viability of the project is questionable. The Allies have expressed their concerns regarding the extent of the restrictions to low-level flying operations. Experience with the current Monitoring and Mitigation Program indicates that low-level flight training will cease to be viable in the near future.

Four precepts have guided the development of options for mitigation. These are:

1. The project described must be viable within defined mitigative measures;
2. The primary goal of the environmental assessment process is to find a means of minimizing adverse environmental impacts by way of a mitigation or area design strategy;

Table 12 Square Kilometers of Low-Level Training Areas Closed Due to Environmental Restrictions

Date (1992)	George River Caribou	Red Wine Caribou	Raptors	Harlequin Ducks	Waterfowl	Resource Users	Sub- Total	Monthly Average	Effective Closures (additional)	Total	Percent Closed
15 Apr	0	453	1,888	0	0	1,740	4,081	April 4,059	2,055	6,114	6.1
22 Apr	0	453	1,888	0	0	1,740	4,081				
29 Apr	0	453	1,888	0	0	1,673	4,014				
06 May	0	453	1,888	0	0	1,740	4,081	May 8,793	419	9,212	9.2
13 May	714	453	1,888	0	0	1,874	4,929				
20 May	5,926	453	1,147	0	4,007	1,548	13,081				
27 May	5,926	453	1,147	0	4,007	1,548	13,081				
03 Jun	9,271	0	1,147	539	4,007	1,884	16,848	June 16,780	717	17,497	17.5
10 Jun	11,860	0	1,147	539	4,007	1,884	19,437				
17 Jun	8,914	0	1,147	608	4,007	809	15,485				
24 Jun	8,914	0	1,147	608	4,007	673	15,349				
01 Jul	8,914	0	1,147	608	4,007	875	15,551	July 10,530	6,120	16,650	16.7
08 Jul	6,823	0	1,147	608	4,007	875	13,460				
15 Jul	0	0	1,281	1,415	4,007	1,009	7,712				
22 Jul	0	0	1,281	1,415	4,007	1,009	7,712				
29 Jul	0	0	1,281	1,415	4,508	1,009	8,213				
05 Aug	3,241	0	1,281	1,415	0	1,076	7,013	Aug 7,453	7,417	14,870	14.9
12 Aug	0	0	1,281	1,415	0	1,076	3,772				
19 Aug	4,862	0	1,281	1,415	0	1,076	8,634				
26 Aug	6,620	0	1,281	1,415	0	1,076	10,392				
02 Sep	4,996	0	0	0	0	1,076	6,072	Sept 7,640	0	7,640	7.6
09 Sep	4,996	0	0	0	0	1,076	6,072				
16 Sep	8,529	0	0	0	0	201	8,730				
23 Sep	8,529	0	0	0	0	134	8,663				
30 Sep	8,529	0	0	0	0	134	8,663				
07 Oct	18,151	0	0	0	0	134	18,285	Oct 18,285	20,000	38,285	38.3
14 Oct	18,151	0	0	0	0	134	18,285				

3. Experience in practice should enable the refinement of mitigation programs to result in minimal impacts and environmental risk;
4. Revision to project boundaries is a desirable approach to achieve the foregoing objectives.

To reconcile the conflicting objectives of maintaining sufficient air space for the training program and of providing adequate protection for wildlife and for human resource users, two mitigation programs (Option A and Option B) are proposed. Option A consists of reducing the scope of the avoidance program within the existing boundaries of the project area, whereas Option B consists of maintaining the existing high standards of avoidance and adjusting the spatial boundaries of the project area so that sufficient air space to meet the requirements of the flying program is available at all times.

Figure 10 depicts the configuration of the LLTAs under both options. Table 13 presents the avoidance criteria that would be in effect under both options.

5.5.3 Mitigation or Enhancement of In-Town Impacts

This section describes measures that are proposed to mitigate or enhance project impacts that are expected to occur "in-town." "In-town" impacts are primarily of concern to the residents of the communities of Central Labrador, namely Happy Valley - Goose Bay, North West River, Sheshatshit and Mud Lake. With a population of over 8,610, Happy Valley Goose Bay has the largest and most heterogenous population in Central Labrador; it has the largest Inuit community in Labrador, but is also home to a significant Métis and settler population, to recent immigrants and military personnel from Britain, Germany and the Netherlands. Sheshatshit is almost exclusively an Innu community, and is home to almost 800 people. North West River and Mud Lake are home to Inuit and settlers and have a population of 528 and 80 respectively.

The following considerations were taken into account when developing the "in-town" mitigation and enhancement measures: first, the project has been under way for a number of years and experience has been gained in dealing with the impacts identified; second, the 1989 Goose Bay EIS proposed measures that were implemented by DND to minimize the adverse impacts that were identified at that time to enhance the benefits of the project. Finally, experience and the evolution of the project over time have made it possible to propose additional measures that will further reduce adverse conditions or improve favourable situations.

Impact mitigation/enhancement measures have been proposed for the following seven distinct subject areas: local economic opportunities, management of development impacts, noise, public health, relations between the military and civilian communities of Happy Valley - Goose Bay, relations between the military and the aboriginal peoples and the decrease or abandonment of low-level flight training. All measures are presented on Table 14. Under each of these subject areas, information is presented on:

- measures currently in place; and
- proposed additional measures.

SUMMARY

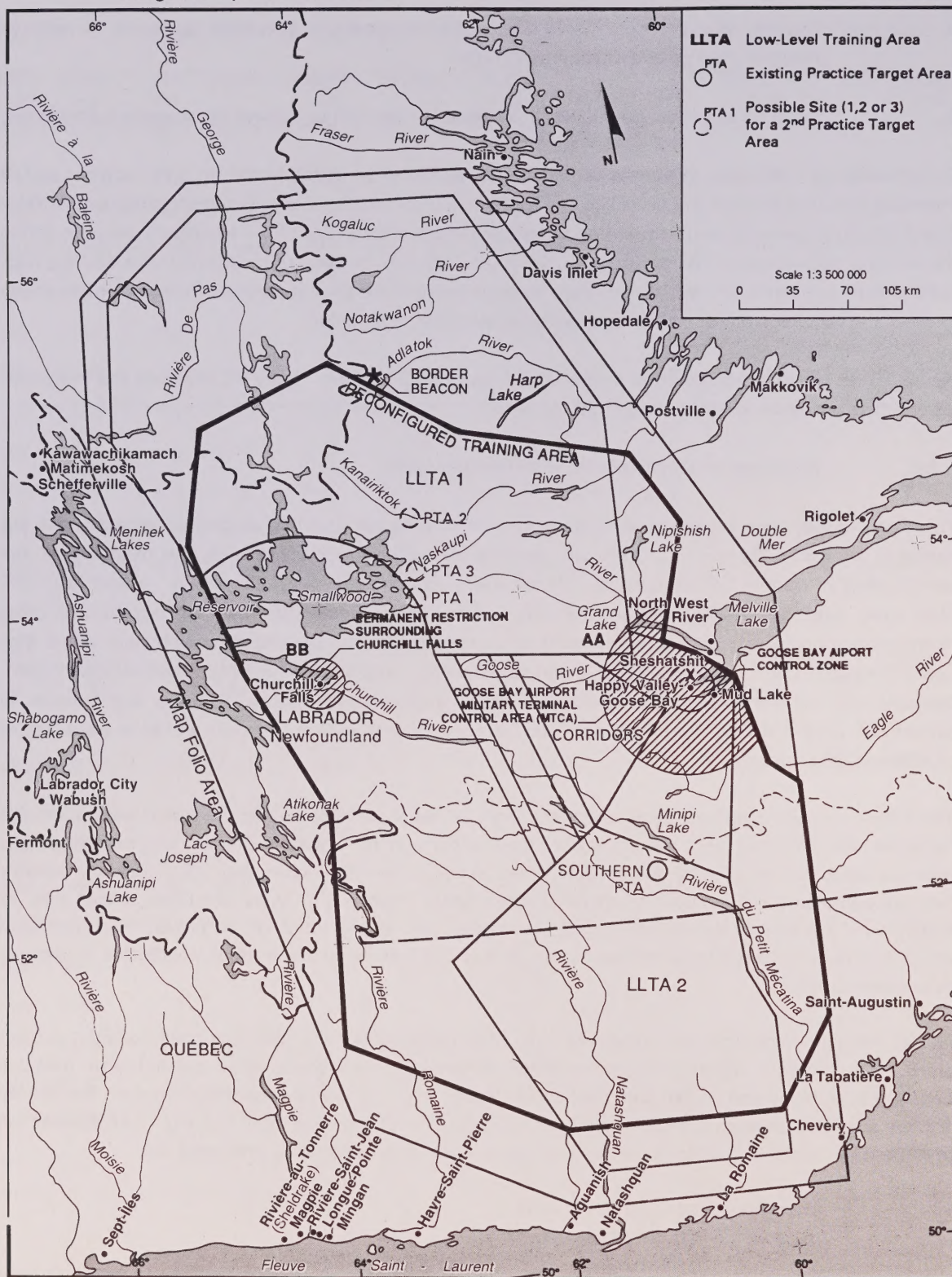


Table 13 Avoidance Criteria Under Option A and Option B

	Option A	Option B
George River Caribou Herd	full protection during pre-calving, calving and post-calving periods; avoidance of only aggregations of 10,000 or more caribou or groups of radio collars at other times	calving, post-calving and rut areas permanently excluded from the training area; concentrations of 500 or greater avoided (based on radio-collar data)
Red Wine Caribou Herd	full protection during late winter; no avoidance at other times.	full protection during late winter. Spot closure of 5 NM radius circle around sighting of group of 10 or more
Moose	no avoidance.	avoidance of concentrations in late winter
Waterfowl	no avoidance.	highest-quality breeding habitat permanently excluded from the training area; concentrations avoided during staging, breeding and moulting
Harlequin Duck	full protection during breeding period	full protection during breeding period; highest-quality nesting habitat permanently excluded from the training area
Cliff-Nesting Raptors	full protection during breeding period	full protection during breeding period; most important breeding area permanently excluded from the training area
Forest-Nesting Raptors	no avoidance	closure of 2.5-NM radius circle around nest site or sighted pair
Resource Users	in high-use areas, a 1 NM-radius circle around a main camp will be avoided during periods of known occupancy	in high-use areas, a 3 NM-radius circle around a main camp will be avoided during periods of known occupancy; in known-use areas, 2.5 NM circle; for base camps, 1.0 NM circle

Table 14

In-Town Mitigation and Enhancement Measures

Area	Measures Proposed in 1989 EIS	Actions Taken Pursuant to Measures Proposed in 1989	Proposed Additional Measures
Increased local economic opportunities	- implement government procurement policies - implement a local preferential hiring policy - encourage CEIC to post Base-related jobs and notify its outreach workers - prepare a manpower plan - communicate requirements for trades training - review need for Base apprentice training programs - commit to equal opportunity employment practices - support program by province and CEIC to direct training to women, coastal and aboriginal communities - develop the awareness and sensitivity of DND supervisors towards local personnel - support life skill programs by province and CEIC	- priority in hiring is given first locally and then to residents of Labrador and Newfoundland - Base-related jobs are posted in CEIC centres in Labrador and Newfoundland - Base apprenticeship program has been set up for labouring trades - targeted minorities: commitment to hiring, promotion of training and emphasis with DND supervisors of awareness of their needs - communication of requirements for qualified trades personnel - Basic Skills Upgrade Program has been developed to enhance work force capabilities for more advanced training	- apply existing government procurement policies to stimulate development - continue to assist local business in being known to Base personnel - local contracting-out and procurement - prepare a civilian human resource plan - involve federal and provincial authorities in planning future civilian recruitment - examine job-sharing and flexible hours - examine feasibility of permanent military positions at CFB Goose Bay
Management of development impacts	- support to on-duty military personnel is the responsibility of DND - negotiate with province and municipality the responsibilities for in-town services for off-duty Canadian and foreign military personnel - make all relevant data available to responsible parties concerning DND requirements and demands on town housing, infrastructure and services - establish a social support office and hired a social worker to provide assistance to military - continue public access to military recreational facilities - post warning signs along roads under transit corridors - discuss with appropriate parties the planning of potential developments affected by or affecting training - provide fire and police services for DND facilities	- working with municipality to develop new supply of potable water - established a social support office and hire a social worker - maintained public access to military recreational facilities - provided fire and police services for DND facilities - warning signs posted by Provincial authorities along roads under transit corridors	- work with municipality to develop raw sewage treatment - work with province on the construction of a new hospital - discuss with province the transfer on-Base schools to the province - give adequate notice if civilians need to be displaced from Base accommodation - if invited, participate in the planning of developments affected by or affecting training - request the posting of signs along roads in the reconfigured training area (Option B)
Noise at Goose Bay Airport	- review and revise present zoning near airport - minimize number of flights after 10:00 p.m. - establish a policy of preferential runway usage, weather conditions permitting - investigate the use of noise-abatement departure and landing procedures, particularly at night - upgrade the sound insulation in buildings most seriously affected by aircraft noise - consider the construction of a noise barrier in Spruce Park - inform the public of efforts to reduce noise exposure	- zoning restrictions based on current noise levels - minimized number of flights after 10:00 p.m. - established Standard Instrument Departures (SIDs). Noise abatement is a prime consideration of the design - constructed a noise barrier in Spruce Park - kept the public informed of measures to reduce noise exposure	
Public health	- establish effective monitoring of the effects of the project - availability of staff, facilities and equipment to respond effectively to issues identified - provide requisite educational and counselling programs - plan and design the new hospital to take account of planned research in this area	- staff and equipment have been made available to provide requisite educational and counselling programs	- provide generic health statistics to assist agencies in monitoring trends in public health - encourage responsible agencies to provide support to counselling programs and services

Table 14 In-town Mitigation and Enhancement Measures (Cont'd)

Area	Measures Proposed in 1989 EIS	Actions Taken Pursuant to Measures Proposed in 1989	Proposed Additional Measures
Relations between the military and the residents of Happy Valley-Goose Bay	- establish a Community Liaison Officer - Base Information Officer to prepare a local newspaper column - continue the toll-free hotline - encourage the enlargement of the Happy Valley - Goose Bay Liaison Committee - continue efforts to consult with the Innu - encourage concerned groups and relevant agencies to communicate with the Base - hold orientation program to sensitize DND employees and Allied staff to local issues - improve access to Base facilities - arrange for a contact person in each community to act as liaison between DND and residents	- established and staffed positions of Community Liaison Officer, Native Liaison Officer and Mitigation Coordination Officer - broadened mandate of Base Information Officer - Base Information Officer has a column in the Base newspaper. Two newspapers and two radio stations are used to provide information to the public - continued to meet with the Happy Valley - Goose Bay Liaison Committee - continued efforts to consult with the Innu - encouraged concerned groups and agencies to communicate with the Base - held orientation programs to sensitize DND employees and Allied staff to local issues - developed informal network of local contact persons in many communities to exchange information and act as liaison between DND and residents	- make public access to the Base as unhindered as possible - continue to encourage responsibility and sensitivity in personnel serving alcohol - use the Family Resource Center to circulate and exchange information - continue to encourage the Chamber of Commerce to organize a "Welcome Wagon" for new military arrivals
Relations between the military and the Innu community of Sheshatshit	- continue consulting with the Innu to share information and resolve concerns - continue the toll-free hotline - encourage the enlargement of the Happy Valley - Goose Bay Liaison Committee to include representatives of the community of Sheshatshit - sensitize DND employees and Allied personnel to aboriginal issues - invite a representative of Sheshatshit to act as liaison between community and DND	- created and staffed a Native Liaison Officer position - continued the toll-free hot line - sought unsuccessfully to enlarge the Liaison Committee to include Innu representatives - held an orientation program for DND employees and Allied personnel to promote awareness and sensitivity to aboriginal issues	- continue to seek ways to work with the Innu
Decrease or cessation of low-level training	- ensure that abandoned structures present no safety or environmental hazard - discuss the transfer of facilities with the provincial, federal and municipal governments - dispose of remaining buildings and land in an environmentally acceptable manner - destroy or dispose of hazardous materials in an environmentally sound manner - remove structures and materials in training areas and rehabilitate disturbed land	- as the project is continuing, none of the measures proposed in 1989 have been implemented	- seek to negotiate inclusion of a two-year advance notice clause in the MMOU with the Allies - inform province, municipality and citizens of pending decrease or cessation of activities - promote the formation of a committee of regional stakeholders - support continuation of the payment of grants-in-lieu-of-taxes for a period of time consistent with usual practice - develop a plan for the gradual termination of employment of civilian employees - continue current employment and business preference policies

The measures currently in place will be maintained for the duration of the project.

These mitigation and enhancement measures are put forward on the basis of findings and conclusions reached in the EIS. DND will also consult with appropriate municipal, provincial and federal agencies and other stakeholders in the implementation and refinement of the proposed mitigation and enhancement measures. The objective is to involve the groups directly concerned by the project. The measures will therefore be adjusted or modified as necessary during the life of the project. These groups include but are not limited to: the two Resource Users Advisory Groups, the Happy Valley - Goose Bay Liaison Committee, other municipal authorities, Employment and Immigration Canada, the Atlantic Canada Opportunities Agency, the Chambers of Commerce, appropriate provincial and federal agencies and departments, resource users, both aboriginal and non-aboriginal groups, affected labour unions, etc.

5.6 Residual Impacts

5.6.1 Biophysical Residual Impacts

The residual biophysical impacts are summarized in Table 15. For both Option A and Option B, the mitigation options discussed in Section 5.5, impacts are lower than they would be without mitigation. However, biophysical residual impacts are generally lower under mitigative Option B than under Option A. Lower impact ratings are predicted under Option B for the George River and Red Wine caribou herd, wolf, arctic fox, arctic hare, peregrine falcon, gyrfalcons, golden eagle, bald eagle, osprey, ducks as a group, harlequin duck and ptarmigan. There is one exception: the Lac Joseph caribou herd has a lower impact rating under Option A than under Option B (no impact as compared to minor impact).

5.6.2 Socio-Economic Residual Impacts

Option A and Option B both generally reduce impacts to resource harvesting. In most instances, impacts are lower under Option B than under Option A (Table 16).

Residual impacts in-town are already being mitigated. Maintaining current mitigation and enhancement measures will ensure that the Base continues to coexist harmoniously with the other communities of Central Labrador.

6.0 EFFECTS MONITORING

Monitoring is an integral part of environmental impact assessment, being the only means of ascertaining actual impacts. DND has developed a monitoring program that will meet the objectives set forth in the Panel Guidelines, which are to:

- provide data not available during the preparation of the EIS;
- test the accuracy of impact predictions;
- identify and address unpredicted impacts;

Table 15 Summary of Predicted Residual Impacts on Valued Ecosystem Components (VECs) and on Ecosystems Under Mitigative Options A and B

VEC or Ecosystem	Option A	Option B
George River caribou	Moderate	Minor
Red Wine caribou	Moderate	Minor-Moderate
Lac Joseph caribou	No impact	Minor-Negligible
Other resident caribou	Negligible	Negligible
Moose	Minor	Minor
Black bear	Minor	Minor
Wolf	Minor	Negligible
Marten	Minor-Moderate	Minor-Moderate
Wolverine	Negligible	Negligible
Mink	Negligible	Negligible
Otter	Minor	Minor
Coloured fox	Negligible	Negligible
Arctic fox	Negligible	No impact
Lynx	Minor	Minor
Beaver	Negligible	Negligible
Muskrat	Negligible	Negligible
Arctic hare	Negligible	No impact
Snowshoe hare	Negligible	Negligible
Small mammals	Minor	Minor
Porcupine	Negligible	Negligible
Seals	Negligible	Negligible
Peregrine falcon	Moderate	Negligible
Gyrfalcon	Moderate	Negligible
Golden eagle	Minor	Negligible
Bald eagle	Moderate	Minor
Osprey	Minor	Negligible
Owls	Negligible	Negligible
Canada goose	Minor	Minor
Ducks	Moderate	Minor
Harlequin duck	Minor-Moderate	Minor
Loons	Minor	Minor
Ptarmigan	Minor	Negligible
Grouse	Negligible	Negligible
Passerine birds	Negligible	Negligible
Fish	Minor	Minor
Vegetation	Minor	Minor
Lichens	Minor	Minor
River valley ecosystems	Moderate	Minor
Terrestrial ecosystems	Minor	Negligible
Freshwater ecosystems	Minor	Minor

Note: See Chapter 10 of the Main Report: "Methodology" for Definitions of the Ratings

Table 16 Residual Impacts on Resource Harvesting (Option A and Option B)

Community	Option A	Option B
<u>Central Labrador</u>		
Happy Valley - Goose Bay	Minor	Minor
North West River	Moderate	Minor
Mud Lake	Moderate	Minor
<u>North Labrador</u>		
Nain	Minor	Nil
Hopedale	Minor	Negligible
Postville	Minor	Negligible
Makkovik	Nil	Negligible
Rigolet	Nil	Nil
<u>South Labrador</u>		
Cartwright	Nil	Nil
Paradise River	Nil	Nil
Port Hope Simpson	Nil	Nil
Charlottetown	Nil	Nil
Strait of Belle Isle Area	Nil	Nil
<u>West Labrador</u>		
Labrador City/Wabush	Nil	Negligible
Churchill Falls	Minor	Minor
<u>Quebec Border</u>		
Fermont	Nil	Nil
Schefferville	Nil	Nil
Kawawachikamach	Moderate	Nil
<u>Quebec North Shore</u>		
Sheldrake/R. au Tonnerre	Nil	Nil
Longue Pointe de Mingan/Rivière St-Jean/Magpie	Nil	Nil
Natashquan/Aguanish	Moderate	Minor
La Romaine	Moderate	Minor
Baie-des-Moutons/La Tabatière	Moderate	Minor
St-Augustin	Nil	Negligible
Vieux-Fort/Rivière St-Paul	Nil	Nil
Blanc-Sablon/Brador	Nil	Nil
<u>Northern Quebec</u>		
Kuujuuaq	Nil	Nil
Kangisualujjuaq	Nil	Nil
<u>Communities that did not participate in research for EIS</u>		
Sheshatshit	Moderate	Minor
Davis Inlet (Utshimassit)	Moderate	Nil
Natashquan	Minor	Minor
Mingan	Minor	Minor
Pakua Shipi	Minor	Minor
Matimekoshe	Minor	Minor

- identify and develop mitigative measures for cumulative impacts; and
- test the effectiveness of mitigative measures.

The goal, called project enhancement, will be to ensure that low-level flying and activities are carried out with minimal disruption to resource users, wildlife and the residents of the Quebec Labrador peninsula. The proposed effects monitoring studies are summarized on Table 17.

7.0 CONCLUSION

Much of the project as described in this EIS existed prior to the release of the Goose Bay EIS in 1989. The current training areas, the corridors between them, the Practice Target Area (PTA), the employment of local residents and the capital investments, all these are primary features of the project and are already in place. The project would see an increase in the number of sorties from current levels to a maximum of 18,000 per year. The project would also include a second PTA.

The project will result in both positive and negative impacts on the area. DND is committed to either eliminating or minimizing adverse impacts through the application of appropriate mitigation and monitoring programs. Implementation of the mitigation measures proposed in this EIS ensure that there are no major impacts under either mitigation option. Furthermore, under mitigation Option B, all impacts save two are reduced to minor or negligible. To date, in order to identify and avoid the most sensitive wildlife in the training area, DND and the other military users at CFB Goose Bay are spending approximately \$1.2 million per year on environmental studies and surveys within the training area. The work has concentrated on species such as the George River caribou herd, the Red Wine caribou herd, raptorial birds and waterfowl, species which had previously been identified as being of particular concern. The information gathered to date has contributed significantly to the data base on the fauna of the region.

DND is similarly committed to enhancing the important economic benefits expected to accrue to the communities of the study area in general and to those of Central Labrador in particular. All mitigative and enhancement measures are described in Chapter 12 of the Main Report.

The military has long had a leading role in the developing history of Central Labrador and military activity has been a major contributor to the economic development of the region since the early 1940s. As a member of the community since its inception, DND wishes to maintain good relations with the residents of the area and is committed to ensuring that the positive impacts of the project are enhanced where possible and that negative impacts are reduced to a minimum.

Table 17 Proposed Monitoring Studies

	Study Title	Study Type	Duration (Years)	Estimated Cost (K\$/Year)
1.	Noise in the Vicinity of CFB Goose Bay	Experimental	2 (twice)	100-125
2.	Ambient Air Quality in the Vicinity of CFB Goose Bay	Screening	1	50
3.	Trace Metal Concentrations in Lichens	Screening	Every 3 years for the duration of the project	30-40
4.	Hydrocarbon Concentrations in the Fuel Dumping Areas	Screening	Every 3 years for the duration of the project	10-15
5.*	Productivity and Habitat Use by Red Wine Caribou	Experimental	4	250-300
6.*	Immediate Behavioural Responses, Movements and Activity Patterns of the George River Caribou			
	(a) Part 1 (Short-Term Responses)	Experimental	2-3	300-400
	(b) Part 2 (Long-Term Responses)	Screening	3-4	50-75
7.	Physical Condition of the George River Caribou	Screening	Every 3 years for the duration of the project	50-75
8.	Trace Metal Concentrations in Internal Organs of Moose and Caribou	Screening	Every 5 years for the duration of the project	25-50
9.	Use of Winter Habitats by Moose	Experimental	3-4	100-125
10.	Energy Balance of Martens	Screening	1-2	50-75
11.	Habitat Use by Martens	Experimental	2-3	150-175
12.	Stress Levels and Productivity of Small Mammals	Screening	1-2	50-75
13.	Behaviour, Habitat Use and Productivity of Harlequin Ducks	Experimental	3-4	100-125
	(a) Part 1 (Short-Term Behavioural Responses)			
	(b) Part 2 (Habitat Use and Productivity)			
14.	Behaviour and Habitat Use by Moulting and Staging Waterfowl	Experimental	2	50-100
15.*	Habitat Use and Productivity of Cliff-Nesting Raptorial Birds	Experimental	4	50-125
16.	Behaviour, Habitat Use and Productivity of Ospreys and Bald Eagles	Experimental	3-4	100-125
	(a) Immediate Behavioural Responses			
	(b) Habitat Use and Productivity			
17.	Immediate Behavioural Responses of Atlantic Salmon	Experimental	2	25-50
18.	River Valley Ecosystems	Experimental	7-8	250-500
19.	Noise Measurements in River Valleys	Experimental	2	75-100
20.	Project-Generated Employment and Operational Expenditures	Screening	Ongoing for the duration of the project	15
21.	Renewable Resource Harvesting Trends	Screening	Ongoing for the duration of the project	25

* Assumes incorporation into the existing avoidance monitoring program.



**ENVIRONMENTAL ASSESSMENT PANEL REVIEWING
MILITARY FLYING ACTIVITIES IN LABRADOR AND QUEBEC**

**PUBLIC INVITED TO COMMENT ON
REVISED ENVIRONMENTAL IMPACT STATEMENT**

OTTAWA, APRIL 21, 1994 -- The public is invited to review and comment on the revised environmental impact statement (EIS) of the Department of National Defence's low-level flying activities in Labrador and Quebec. The federal environmental assessment panel reviewing these activities made the document available today.

The revised EIS does not include three of the four native translations of the summary document, as required by the panel. The panel appreciates the efforts made by the Department of National Defence (DND) in this regard. However, the panel does not want to place any group at a disadvantage by giving them a shorter review period. As a result, the panel has decided to defer the start of the 90 day review period to allow for additional time for the outstanding native translations of the summary document. The panel will make an announcement with respect to the start of the 90 day review period within the next two weeks.

The panel is inviting the public, government agencies and technical specialists to study the revised EIS and comment in writing on whether the document adequately addresses each requirement of the revised deficiency statement issued to DND by the panel in December 1991. The requirements of the 1987 panel guidelines document should be kept in mind during this exercise. Reviewers should also comment on whether DND has sufficiently addressed each issue so that a meaningful discussion can take place at the forthcoming public hearings. Written comments must be received by the end of the 90 day review period.

At this stage of the review, the panel is not inviting comments on the merits of the opinions and conclusions of the study, or on the overall proposal as put forth by DND. Such comments should be made at the time of the public hearings.

After its own examination of the revised EIS and after reviewing the written comments received, the panel will determine if the information is sufficient to proceed to public hearings. When the hearings are announced, the panel will give at least 21 days notice. If further information is required, the panel will request the information from DND.

Canada

Information

The revised EIS consists of a summary, a main document, and supporting technical documents. A copy of the summary is enclosed.

Please send any written comments to:

Jim Clarke
Panel Manager
Federal Environmental
Assessment Review Office
13th Floor, Fontaine Bldg.
200 Sacré-Coeur Blvd.
Hull, Quebec
K1A 0H3

Tel: (819) 997-2262
Fax: (819) 994-1469

**ENVIRONMENTAL ASSESSMENT PANEL REVIEWING
MILITARY FLYING ACTIVITIES IN LABRADOR AND QUEBEC**

**PANEL HIRES TECHNICAL SPECIALISTS TO ASSIST IN REVIEW OF
REVISED ENVIRONMENTAL IMPACT STATEMENT**

OTTAWA, APRIL 21, 1994 -- Seven technical specialists have been hired by the federal environmental assessment panel reviewing military flying activities in Labrador and Quebec.

The technical specialists will review sections of the revised Environmental Impact Statement (EIS) that are relevant to their area of expertise. The specialists will then submit written comments to the panel within the 90 day review period to be established by the panel, and these comments will be available to the public. The revised EIS was submitted by the Department of National Defence and made publicly available by the panel today.

A list of the specialists with short biographical sketches of each is attached.

For further information:

Jim Clarke
Panel Manager
Federal Environmental
Assessment Review Office
13th Floor, Fontaine Bldg.
200 Sacre Coeur Blvd.
Hull, Quebec
K1A 0H3

Donna Paddon
Information Officer
P.O. Box 1667, Station B
215 Hamilton River Road
Happy Valley-Goose Bay
Labrador
A0P 1E0

Tel: (819) 997-2262
Fax: (819) 994-1469

Tel: (709) 896-4737
Fax: (709) 896-4740

**TECHNICAL SPECIALISTS FOR THE
ENVIRONMENTAL ASSESSMENT PANEL REVIEWING
MILITARY FLYING ACTIVITIES IN LABRADOR AND QUEBEC**

Dr. William Montevecchi

Impacts on Birds

Dr. Montevecchi is affiliated with the Psychology and Biology Departments and Ocean Sciences Centre of Memorial University of Newfoundland, where he is the Chair of the interdisciplinary Biopsychology Program. His research interests are targeted on the roles of birds as bio-indicators in marine and terrestrial ecosystems. He has published over 100 scientific papers, created the CBC Radio Ideas Program, Seabirds: Oceanic Barometers, and co-authored the book, Newfoundland Birds: Exploitation, Study, Conservation, published by the Nuttall Ornithological Club at Harvard University.

Dr. Peter Duinker

Mitigation/Avoidance Program

Dr. Duinker is an associate professor and holder of the Chair in Forest Management and Policy, at the School of Forestry, Lakehead University, Thunder Bay, Ontario. He has held research positions in the fields of forest management, forest ecology and environmental impact assessment. Publications include co-authorship of the report An Ecological Framework for Environmental Impact Assessment in Canada. Dr. Duinker is a member of the Canadian Institute of Forestry and the Society of American Foresters, and has been a member of several professional committees, including the Environmental Advisory Panel at Ontario Hydro.

Ms. Carol Brice-Bennett

Socio-Economic Impacts (Labrador area)

Ms. Brice-Bennett has been the Executive Director of the Labrador Institute of Northern Studies based at Happy Valley-Goose Bay since 1986. She has conducted various studies over the last twenty years on aspects of the social, cultural and economic organization of Labrador, with particular emphasis on resource use and regional development, and occasionally teaches an undergraduate course on Labrador history. Ms. Brice-Bennett was recently Chairperson of the Industrial Adjustment Service Committee on the Labrador Coast Fishery and has served since 1990 as Secretary of the Battle Harbour Historic Trust.

The firm ssDcc Inc., formed in 1979, specializes in the field of applied social science with an emphasis in cultural and intercultural research. This firm provides consulting services in social sciences, development and cultural change. A major part of the work has either been done for native organizations, or involved native issues. Past research and experience involves cultural changes and mega-projects, inter-cultural awareness seminars, stereotypes and education programs, public hearings and methods of communication, and issues in the administration of justice in an intercultural context.

Mr. Ian Juniper

Impacts on Caribou

Mr. Juniper is the secretary-treasurer of the Hunting, Fishing and Trapping Coordinating Committee, an organisation based in Montreal and established under the James Bay and Northern Quebec Agreement. For over 10 years, he held the position of research biologist with the Ministère du loisir de la chasse et de la pêche, gouvernement du Québec, responsible to the director for research on caribou, polar bear and musk-ox. Prior to that, he was regional biologist for the district des Laurentides, responsible to the chief biologist for research and management of big game.

Dr. Nicholas Novakowski

Impacts on Small Mammals/
Avoidance Program

Dr. Novakowski is an Ottawa-based fish and wildlife specialist with lengthy involvement in environmental matters in the context of environmental planning, management and impact assessment, specifically dealing with large mammals, furbearers, waterfowl, upland game birds and raptors, and limnology and fisheries. Dr. Novakowski also has experience in the development of monitoring procedures for determining the success of mitigation efforts for impacted ecosystem components.

Dr. Raymond Hétu

Physiological and Psychological Impacts
of Noise on Humans

Dr. Hétu is a professor at the Ecole d'orthophonie et d'audiologie, Faculty of Medicine, University of Montreal. He is Director of the Acoustic Group at the University of Montreal, President of the Canadian Acoustic Society, and a fellow of the International Collegium of Audiological Rehabilitation. Dr. Hétu has conducted research in the auditory effects of impulse noise, the evaluation of handicaps associated with deafness, the epidemiology of deafness, and stress due to noise.

